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PROGRESS IN THE TREATMENT OF SOME DISEASES OF THE BLOOD*

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ALTHOUGH isolated instances of severe anemia of unknown etiology had been observed even as early as 1822, the first fairly comprehensive description of the disease condition, now generally known as pernicious anemia, was made in 1855 by Thomas Addison in his work on the Constitutional and Local Effects of Disease of the Suprarenal Capsules. In this description the condition was designated as "idiopathic anemia," because the anemic state was unattended by any demonstrable cause.

During the fifteen year period following Addison's discussion of the disease several reports of similar cases were published but it was not until 1872, in which year Biermer described a group of patients with severe anemia of varying etiology, that real interest in the subject was aroused. Biermer proposed the name "progressive pernicious anemia" as a designation for the group of miscellaneous cases of anemia which he described and this term has been more generally accepted than has the one proposed by Addison. In 1878 Eichhorst published a rather lengthy monograph on Progressive Pernicious Anemia, and five years later Laache of Christiania published a monograph on Anemia which consisted of 256 printed pages together with many graphs and plates illustrating the blood changes. The sporadic appearance of crops of papers concerning this interesting type of anemia bore evidence of the smoldering interest in this subject which persisted up to the time of the introduction of liver therapy.

Addison's clinical description of the disease, although not complete, was accurate in most

respects. The papers which followed added much to the clinical picture. Biermer called attention to the frequency of retinal hemorrhages during the severe stage and the occurrence of fever in his cases. Laache described particularly the presence in the blood of large, deeply colored corpuscles. Quinck had previously called attention to the variation in shape of the red blood corpuscles, the poikilocytosis. Hunter emphasized the importance of the previously described glossitis as an aid to diagnosis. The slight icterus, not observed by the early observers, the characteristic changes in the blood and the nerve manifestations were all subsequently described, thus leaving little of the clinical picture unrecognized up to the end of the first quarter of the present century.

New interest in pernicious anemia has been aroused since the introduction of its successful treatment with liver approximately ten years ago. Investigation during this period has been productive along several different lines.

Various theories as to the etiology were proposed in some of the early writings and perhaps the one of greatest interest, when considered in the light of our present knowledge, is that presented in 1880 by Fenwick in his book on Atrophy of the Stomach. Fenwick wrote, "Indeed most of the symptoms are not the immediate result of the atrophy of the stomach but arise from the deficiency of the blood produced by it." And again, "It will be readily conceded that the anemia that accompanies atrophy of the stomach is the result of the imperfect secretion of the gastric juice consequent upon it."

Clinical confirmation of Fenwick's concept, that imperfect gastric secretion plays an important role in the production of the anemia, is now

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available. Evidence has been presented which indicates that the normal stomach secretes a substance which interacts with substances contained in certain foods to produce a blood building factor. Failure to secrete this substance or to ingest or utilize certain foods may result in the development of pernicious anemia. More recent studies suggest that there may be varying degrees of lack of the "intrinsic factor" or secretion, thus accounting for the variations in the severity of the disease.

During the seventy-year interval following Addison's paper two schools of thought existed concerning the fundamental process involved in the production of the anemia. One, championed by such men as Cohnheim and Ehrlich, believed that the primary disturbance was one of altered blood regeneration, whereas the other, led by Hunter, Muir and others, believed that the primary disturbance was one of abnormal blood destruction. Although the occurrence of abnormal amounts of bilirubin in the blood serum and the renal excretion of urobilin have perhaps never been adequately explained on an experimental basis, evidence which has become available during the past ten years leaves little room for doubt but that the fundamental cause for the anemia is one of altered blood regeneration. Pathologic studies of the bone marrow during relapse and various stages in the remissions of the anemia, the demonstration of a gastric secretion which influences blood regeneration and the events which follow the institution of liver therapy all favor such a concept. Although in addition to this there may be an abnormal destruction of red blood cells, it seems more likely that there is a failure to utilize certain substances necessary for the production of red cell stroma or of hemoglobin because of the absence of a proper stimulus to cell maturation.

This theory is strongly supported by the rapid disappearance from the blood stream of the bilirubin and from the urine of the urobilin during the first few days of a remission induced by liver therapy, the interval when rapid regeneration of blood cells and hemoglobin has begun and during which time the reserve supplies of blood forming substance are most needed. It is possible also that there is altered function of the reticulo-endothelial or Kupper cells of the liver or that the bile pigment is of such a nature that normal

excretion and utilization does not occur, thus giving rise to the hyperbilirubinemia and excretion of urobilin.

During the period of years prior to the introduction of liver therapy treatment of pernicious anemia was unsatisfactory and consisted largely of an effort to relieve the symptoms of the disease. Arsenic, in the form of Fowler's solution, was used for many years following its introduction by Bramwell, in 1877. Although remissions of the anemia were reported following its use in a few instances, the majority of patients did not respond to it. Iron was early found to be of little value when used alone. Mercury, mercurochrome intravenously, various foreign proteins, bone marrow and spleen as well as many other substances were tried, but without definite or uniform effect. Diluted hydrochloric acid became popular primarily for its effect upon the diarrhea and other gastro-intestinal disturbances, in which conditions it may still be considered to be of value.

Transfusion of blood became the principal method of treatment following the development of the methods of blood grouping. Although remission of some degree was frequently observed following transfusion there was a limit to the number of transfusions which might be given to any individual owing to the fact that, sooner or later, reactions occurred which prevented their further use. Transfusion was also an expensive method of therapy and was available in large numbers only for the patient with considerable means.

Splenectomy was in vogue at one time and was considered to be of benefit particularly in those patients in whom there was splenomegaly. It is possible that the beneficial results were actually observed in certain blood conditions which were then confused with pernicious anemia for rarely have we observed splenomegaly in our cases of true pernicious anemia since the introduction of more adequate means of differentiating the various blood dyscrasias.

Therapy which had as its principal constituent whole liver to be ingested in large amounts daily was first made available for general use in the spring of 1926. Even at that time simple water extracts of liver had been used successfully in the treatment of some of our patients at the Peter Bent Brigham Hospital and shortly thereafter was developed the method of extraction of

the active material from liver which formed the basis for the subsequent production of commercial extracts. These extracts were first administered perorally and in this form simplified treatment for the patient who found it difficult to obtain or to ingest inadequate amounts of whole liver. It still retained the disadvantage of necessary daily ingestion and proved to be an expensive form of treatment.

Further simplification of treatment resulted from the development of extracts of liver which could be used parenterally. These preparations have been designed both for intravenous and intramuscular injection and have varied in their concentration. Extracts for intravenous use have shown no advantage over those prepared for intramuscular injection and have the disadvantage of the danger of producing disturbing reactions. Highly concentrated extracts for intramuscular injection have been developed, which are characterized by their uniform and high degree of potency, and which will have the effect, for maintenance purposes, of fifty times the amount of liver from which they are prepared if this were administered perorally. At first prepared in such concentration that 5 c.c. represented the active material from 100 gms. of liver, later concentrated to 3 c.c., now it is refined and concentrated so that the active material from 100 gms. of liver is contained in 1 c.c. of the extract.

The introduction of extracts for parenteral administration has resulted in more rapid increase of the red blood cells following the institution of therapy during relapse and the greater concentration of the extract allows adequate initial and maintenance treatment to be carried out with minimal inconvenience to the patient.

Initial treatment during relapse may consist of the intramuscular injection of the extract obtained from 400 gms. of liver during the first twelve to twenty-four hours and, with the use of highly potent material, this should be sufficient to increase the red blood cell level, in an uncomplicated case, to between 4,000,000 and 4,500,000 cells per cubic millimeter within a period of four weeks regardless of the initial blood level. This will mean that cells may be formed at a rate greater than 100,000 per cubic millimeter per day during a period of twenty-eight days in those patients having the lower initial red blood cell

counts. The normal blood level of 5,000,000 cells per cubic millimeter will be reached quickly with subsequent weekly injections of the material prepared from 100 gms. of liver and this or a higher count may be maintained thereafter by the judicious selection of the interval between injections of a like quantity. Experience has demonstrated that generally one injection at two, three or four week intervals will be a proper maintenance dose, but this interval must be determined for each patient.

Because of its great efficiency the use of the concentrated extract offers a distinct economic benefit to the patient and to the hospital. Owing to the rapid and certain response the period of hospitalization may be shortened and the patient will be most quickly returned to economic efficiency. Rarely will it be necessary for the patient, with uncomplicated pernicious anemia, to remain in the hospital for more than two weeks, which means a saving to either the patient or to the hospital. It has been estimated that the amount of a highly potent extract for intramuscular use prepared from 100 gms. of liver will replace 5,000 gms. or approximately eleven pounds of whole liver or extract for peroral use prepared from 8,400 gms., approximately 18 pounds of liver, and its cost is only a fraction of the cost of either. The expense of injections will be relatively small with the use of the more highly concentrated and potent material because of the need for injection at infrequent intervals, and so another distinct saving in expense will be possible.

Not only has the chemist helped us to improve our methods of treatment but progress has been made toward the purification and isolation of the active principle in liver. Actively potent material has been isolated in crystalline form, probably amino-acids having the characteristics of the glucosamines.

The results of the liver treatment fully justify the benefits anticipated during the early years of its use. Although reports of inability to obtain optimal benefits to all systems involved are occasionally seen, such results may usually be attributed to inadequate dosage, incorrect diagnosis or to complicating pathology. With the use of adequate amounts of liver or of an effective substitute for it combined with intelligent supervision of the patient's entire regimen of living,

in so far as this may influence his fundamental disease condition, one may anticipate optimal benefits from the treatment, hardly equalled by the results obtained in the treatment of any other chronic disease state. Under the influence of adequate treatment and supervision of a patient with pernicious anemia, not hampered by a serious complication, the blood may be maintained in a normal state, the more important disturbances occurring along the alimentary tract, such as the glossitis, diarrhea and even constipation, will be improved and the disturbances resulting from spinal or peripheral nerve damage will be prevented or controlled and improved. Experience has shown that during continuance of an adequate regimen of treatment, death of a patient would not occur from pernicious anemia, with the possible exception of the rare patient in whom satisfactory control of the anemic state may be prevented by the presence of some intercurrent complication which in itself will not cause death.

Owing to the fact that treatment by this method has been carried out for a period of time only slightly more than ten years it is not possible to predict how long one may continue to remain in good health under a regimen of adequate therapy. Present indications are that this is possible during the natural life span of the individual and that death will result from other illnesses to which we are all susceptible. Of forty-five cases reported in the spring of 1926 as having been under treatment for varying periods of time up to one and one-half years it has been possible to follow forty-two. Of this number thirty-one are still living, eleven have died but, with the possible exception of one patient, death resulted from causes other than those which might be attributed to a condition related to pernicious anemia.

Complicating pathologic states have occurred frequently but with rare exceptions has any single complication been present sufficiently often so that an unusual susceptibility is to be suspected. Unusual distribution of skin pigmentation, particularly that irregular, blotchy distribution of pigment known as vitiligo, has been observed most frequently. Around 10 per cent of our patients have shown vitiligo, varying in distribution from small areas on hands and arms to large ones on the face, neck and even generally

distributed over the body, and of course particularly prominent during the summer months. Cystitis and pyelitis and disturbances of the biliary system have occurred rather frequently. Diabetes mellitus, arthritis, cardiac difficulties, hypertension, phlebitis, nephritis, asthma, hyper- and hypothyroidism and malignancies involving almost any part of the body have each occurred in a small percentage of instances. Pulmonary difficulties, such as pneumonia and tuberculosis, have been notably rare in their occurrence. Based on the evidence presented one may therefore conclude that the life expectancy of the well treated patient with pernicious anemia is that of the average of those persons in the same age group.

With progress in the development of our knowledge concerning the problems of the pernicious anemia patient there has become available information of value in the control of two other fundamental blood diseases, notably anemia of the so-called secondary or hypochromic type and agranulocytosis or acute granulocytopenia.

Interest in the treatment of hypochromic anemia dates from Dr. Blaud's report in 1832 of the successful control of chlorosis with the use of iron in the form of ferrous carbonate. Although this severe and interesting form of anemia, described as occurring almost entirely in young women, has practically disappeared, its place has been taken by a hypochromic anemia observed in severe form almost entirely in women above the age of thirty. This condition at one time known as chronic chlorosis is in this country now more commonly called idiopathic hypochromic anemia, whereas in Europe it is often referred to as achylic hypochromic anemia. There are no fundamental differences between the blood picture observed in this condition and in chlorosis and it is quite probable that the fundamental disturbance is the same in both and that the clinical differences noted are dependent upon the difference in the age group affected and upon the greater chronicity of idiopathic hypochromic anemia as contrasted with the more acute chlorosis. The blood is characterized in the more severe occurrences of the disease by a remarkably low hemoglobin level as compared to the alteration in red blood cell level, resulting in some of the lowest color and iron

index values recorded. Clinically the condition may often be suspected by the peculiar tan colored pallor, particularly evident in the patient with brown eyes in whom it so frequently occurs, by the dry skin and brittle finger nails. Soreness of the tongue is noted frequently and achylia gastrica is often but not uniformly present.

As originally observed in chlorosis, iron remains the treatment of fundamental importance in the large group of hypochromic or iron deficiency anemias which includes, in addition to the idiopathic type, anemia resulting from chronic loss of blood, that occurring during pregnancy, and that accompanying infections. It is generally conceded that the peroral use of iron in the form of a salt is more effective than when administered parenterally. Although there is undoubtedly some difference in the efficiency of the various iron salts available for use it is likely that adequate doses of any will produce a satisfactory result and the choice of salt is to be made on the basis of convenience of administration and their effects in other ways than blood building. Some iron salts are more likely to be constipating than are others.

Whereas our knowledge concerning the use of iron has progressed little since Dr. Blaud's day, studies carried on recently have aided us in utilizing means of enhancing the efficiency of the iron. Regulation of the diet so that it will supply the usual needs of the normal person or the unusual need of the individual patient under consideration is usually advisable. Whole liver alone is an effective means of building hemoglobin and when used in conjunction with iron the combined effect is greater than is that of either alone. Liver extracts for use perorally have shown little effect in the anemias of man, whereas when administered parenterally the effect is distinctly better both in respect to hemoglobin formation and clinical improvement. This effect, as opposed to that observed from the peroral use of liver extract, is perhaps due to the much larger amount of efficient material used or to some difference in utilization of the materials.

A condition characterized by severe leukopenia largely dependent upon a decrease in cells of the granulocytic series, without striking anemia or an unusual tendency to bleed and associated with

ulceration and necrosis of mucous surfaces, was first described by Schultz in 1922. This condition he designated as agranulocytosis. Since Schultz' original description of his cases many others have been reported with a leukopenia and decrease in the symptom-complex described. Inasmuch as the cases described vary considerably in chronicity and probably as to etiology and because the present discussion deals primarily with the typical acute cases, it may be well to classify them as acute granulocytopenia.

The typical attack of acute granulocytopenia or agranulocytosis is generally preceded or accompanied by evidence of an infection, perhaps most often focal in type but occasionally generalized. The onset is usually abrupt with severe headache, high fever, rapid pulse, chill, and frequently generalized aching, sore throat and spongy sore gums. The onset may simulate an attack of so-called "grippe" although the degree of prostration is generally far greater than the physical signs of the illness warrant. Following this abrupt onset there may occur, if treatment and consequently improvement be delayed, a gangrenous or necrosing lesion involving the throat or tonsillar region, the buccal or other mucous surfaces as the vagina, cervix, anal regions or even the mucosa of the intestinal tract. With the latter involvement diarrhea may occur. The ulcerations or necroses are not to be considered as the primary infection but rather as secondary to the granulocytopenia. During the course of the illness there may occur a rash, herpes labialis, nausea and vomiting, dysphagia and occasionally epigastric pain and tenderness. Broncho-pneumonia has been present frequently in the terminal stages and this may be accompanied by jaundice.

During the stage of onset the blood generally shows some degree of leukopenia, the leukocyte count may range between 1,000 and 2,000 with a decrease, but not complete absence, of granulocytes. During the next few days the process may progress rapidly, with increase of the leukopenia to levels under 1,000 and the granulocytes may entirely disappear from the stained blood film. The hemoglobin, erythrocyte and platelet levels are rarely disturbed. Occasionally anemia of moderate degree is present, possibly because of its pre-existence in the individual affected. Although Schultz postulated the absence of

hemorrhagic tendencies, cases probably typical in other respects have been reported with evidences of purpura and bleeding. The occurrence of such a condition should, however, lead one to suspect the presence of some other blood dyscrasia. The icteric index will be increased in the presence of jaundice.

In the earlier reports of this condition the prognosis was considered to be distinctly unfavorable. The great majority of cases progressed rapidly, usually within a few days, to a fatal termination. With the introduction of treatment by means of small doses of x-ray over the long bones, with the use of nucleic acid derivatives and, perhaps more important, the earlier recognition of the condition there have been many more recoveries. It is not my intention, however, to discuss either the etiologic factors concerned or the advantages of the various forms of treatment advised but rather to indicate the possible value of liver and its extracts as therapeutic measures.

During the early days of the use of whole liver in the treatment of pernicious anemia it was observed that the granulocytes of the blood increased in number coincidentally with the increase of the red blood cells. With the use of liver extracts parenterally even more rapid response of the granulocytes was noted. It seemed advisable to determine whether or not this response was peculiar to pernicious anemia patients and a natural consequence of improved

bone marrow function. It was then observed that a striking granulocytic increase occurred in normal subjects following single intramuscular injections of a concentrated solution of liver extract. Similar responses occurred in patients having an acute upper respiratory infection in whom a moderate degree of granulocytopenia was present.

With this evidence available it seemed logical to expect to obtain favorable results in the treatment of acute granulocytopenia. Six typical cases have been treated with daily or more frequent injections with recovery in each instance. Several similarly treated cases have also been reported in the literature, with recovery in each instance in which it was evident that adequate therapy was used. Two patients, having had respectively ten and two relapses of granulocytopenia, have now been observed for over four years without relapses, during which time they have taken regularly either whole liver or extract perorally.

Although the evidence available may be insufficient to establish the value of liver as an important prophylactic measure or of liver extract administered parenterally as the treatment of choice, the evidence is sufficient to warrant further use which may prove that liver or its extracts are quite as valuable in the control of acute granulocytopenia as they are in pernicious anemia.

ENDOCRINE THERAPY*

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ENDOCRINOLOGY, the study of the glands of internal secretion, is a relatively young branch of medical science. It is, therefore, not surprising that certain portions of this field are much better understood than others. Some of the discoveries made in research laboratories in the last few years give promise of startling results when the new knowledge can be applied

in the treatment of sick persons. It is possible to do harm as well as good with the powerful extracts which can be made from several glands. Consequently, a caution needs to be sounded as to the use of any potent glandular products except by physicians who thoroughly understand their use. In some cases the experience of the medical profession is sufficiently extensive that the general practitioner may safely use the glandular materials. Other preparations should, at

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present, be applied to humans only by those research investigators who are equipped to decide who needs treatment, and what should be given, and to watch for any signs that would require interruption of the treatment. It is, therefore, important to point out to the medical profession, from time to time, which gland extracts are in one class, which in the other.

Thyroid Gland

Deficient action of the thyroid gland leads to cretinism in childhood or myxedema in adults. There is one specific treatment universally recognized, the use of dried thyroid glands in tablet form. For the sake of uniformity in results it is preferable that we use only U. S. Pharmacopœia standardized thyroid. This is available in tablets containing from 1/10 to 5 grains each. Doses per day vary from 1/4 to 5 grains. The need for any one patient must be determined by the use of the basal metabolism test, the study of weight, pulse rate, skin, nervous, and muscular action, and mental changes. It is unsafe for thyroid to be used except under a physician's guidance. The treatment is not a cure but a replacement of the deficiency, and must usually be continued throughout life. There is no acceptable substitute for the use of thyroid. Thyroxin is not better.

Excessive action of the thyroid gland occurs in several forms, but the distinctions between these are beyond the scope of this lecture. The condition of the patient, the nature of the thyroid gland in the individual, the duration and the probable cause of the trouble are among the factors which will determine exactly which course of therapy is to be followed. The general principles to be followed are to remove the causal factors when they can be identified (unfortunately true too infrequently), or to interrupt the dangerous process by the removal of most, but not all, the thyroid gland. This removal is done either by surgery or the use of the x-ray, which causes gradual destruction of the gland. Surgery is most widely used, is quicker, must be used when prompt results seem imperative. The dependability of the x-ray for properly selected cases is increasingly evident. The x-ray method must never be used except by radiologists who are equipped to measure the dosage and who can cooperate with physicians in deciding on the extent of the treatment. Thyroid surgery

has had its dangers greatly reduced since the Mayo Clinic group demonstrated the advantage of using small doses of iodine during the days immediately preceding the operation. Iodine must not be thought of as effecting a cure; it prepares a patient for operation with less risk. The after-care of patients who have had thyroid removal is a chapter requiring numerous details of dietary, hygienic, and medical precautions. The fact that recurrences are recognized following even the best therapy of today is evidence that this program leaves still better methods to be sought for.

Iodine is, undoubtedly, one of the essential foods. Deficient supply of iodine is at least one factor in the production of the colloid goiters so common in some regions of the United States, including the Great Lakes region. This iodine can be best supplied to the population by the universal use of iodized salt. It may be that with the conventional amounts of iodine in use, the supply via the salt route might be inadequate, especially for rapidly growing children. Therefore, it is usually considered wise to add the use of small tablets of some form of iodine once weekly throughout the school year for children in this area. There is little reason to believe that the use of these amounts of iodine can cause any thyroid disease, as was feared for some years. The use of iodine to assist in the control of these adolescent colloid goiters is good practice. It may best be given internally. The treatment is not commonly successful after adult growth has been attained.

The use of thyroid tablets in the reduction of excessive weight is widespread. Under medical supervision of a very careful sort it may be safe. The use of any sort of thyroid preparation without medical advice is definitely unsafe. It is futile to attempt to avoid the need of dietary limitation by the use of thyroid. Usually careful physicians prefer to do without the use of thyroid unless there is evidence for a partial hypothyroidism as a causative factor in the obesity.

Parathyroid Glands

Damage to the parathyroid glands or their removal during surgical treatment of hyperthyroid states leads to tetany. The picture is permanent only when the glands are entirely destroyed. For acute emergencies of this type there are two steps: the hypodermic injection of the

parathyroid extract, using doses of 100 units, and the intravenous injection of calcium salts. Of the latter, the calcium gluconate is the easiest and safest to give, using the 10 per cent solutions available. Calcium chloride is a little more effective, but should be diluted to 0.5 per cent in normal saline. For the continued treatment of these patients the diet is to be chosen so as to furnish an abundance of calcium, a low supply of phosphorus, and it, therefore, must contain no milk, little meat, and other details need attention. Calcium can be further assured by administering the gluconate in tablet form, or the chloride in dilute solution. The use of the parathyroid extract is probably best reserved for emergencies. It is still in an impure state, and after prolonged use its effectiveness is gradually lost.

There are now recognized several states in which the fundamental trouble is overactivity of the parathyroid glands. The results are either a diffuse demineralization of bones or the formation of cysts in various bones. There is frequently the deposition of calcium in non-osseous structures, the most dangerous being in the kidneys, where serious forms of renal damage follow. One of the kidney problems is the formation of recurrent stones, in the renal tissue or in the pelvis or ureters. These cases of hyperparathyroidism are still rather infrequent. The differentiation of these from other types of bone and kidney trouble is still impossible without skilled x-ray examination plus study of blood calcium level. Therefore, it is advisable that any patient who is suspected of a parathyroid disturbance be sent to one of those well equipped hospitals where these factors can be evaluated. The results of surgical therapy in the earlier stages of this trouble are brilliant. The profession must be alert to detect cases early.

Thymus Gland

The thymus is situated adjacent to the thyroid. It seems evident, from the work of the last two years, that this gland is important in the rate of development from infancy to maturity. It does not seem to cause excessive growth. With the preliminary knowledge we have, it is far too early to attempt any treatment of human cases with thymus gland extracts. Perhaps we should

be more cautious about the use of x-ray treatment over the thymus region, to avoid destroying a gland which may be of importance. An enlarged thymus is probably not as dangerous as was formerly supposed, except when it interferes with respiration.

The Pancreas

Deficient action of the pancreas is one of the commonest causes of diabetes mellitus. In addition to reduced ability to supply insulin to the body, it is now suspected that other factors may be important at times, such as interference with the activity of the insulin which is present, or disturbances of certain organs such as the liver and muscles where sugar is used. Nevertheless, the therapy of diabetes is still carried out essentially as if it were simply a deficiency in the insulin supply, to be made good by dietary readjustment with or without the use of insulin hypodermically. Until we know a great deal more about the causes of this common disease we can do little else in its treatment. In the meantime the outlook for long life and useful and otherwise healthy existence for the diabetic has been enormously improved by the discovery of insulin. It is agreed that use of insulin without careful dietary regulation is an unsafe practice. The diet should be adequate in calories for the maintenance of the individual at whatever occupation he chooses. The protein allowance should be moderately restricted, not less than 50 nor more than 100 grams per day. The ratio of carbohydrate to fat varies rather more widely today than it did ten years ago, but there is still very little evidence to show danger from the use of sufficient fat to supply at least two-thirds of the calories. The diets which are low in carbohydrate often make possible the avoidance of insulin, or the use of smaller doses. The carbohydrate supply must be large enough so that there will be no acetone bodies in the urine. If such a maintenance diet cannot be taken without glycosuria or hyperglycemia, the use of insulin is indicated. The doses have to be determined by trial in each patient. The maximum dose per day, for the most severe diabetic on a maintenance regime, seems to be less than 100 units. The number of doses per day varies from one (usually before breakfast) to four, given before meals and at bedtime. In the cases

of great severity, it is commonly possible to attain success with three doses if the first is given on rising, and the other doses at as nearly as possible eight-hour intervals thereafter. The meal schedule is not disturbed. The size of the individual doses is to be adjusted to that point at which there will be neither sugar in the urine at any time of day, nor the symptoms of an abnormally low blood sugar. If both ends do not seem attainable with reasonable ease, it is better to avoid the hypoglycemic reactions, permitting slight traces of glycosuria in the early morning hours. In caring for these extremely severe patients, we come to recognize the speed with which the pancreatic hormone acts, as shown by the very rapid changes in the blood sugar level. The use of blood sugar determinations to control the progress of a diabetic under therapy is very essential, if these changes are to be recognized. In this connection it must be recalled that with normal persons or with diabetics not using insulin the blood sugar is near its lowest level before breakfast. When insulin is used, the blood sugar is at its highest at this time. The effectiveness of a single dose of insulin lasts for from six to ten hours.

There is, so far, no useful substitute for the hypodermic injection of insulin. Materials to be taken orally are not helpful enough to be dependable. The numerous substitutes offered are usually fraudulent and may be dangerous to the life of the diabetic by delaying the necessary use of insulin.

There is an increasing number of non-diabetic patients in whom symptoms resembling the insulin reaction have led to a diagnosis of hypoglycemia. In a few cases it has been proved that there was an associated pancreatic tumor, with overproduction of insulin. Removal of the tumor has given brilliant results. Probably most of the patients suffering from recurrent attacks of hypoglycemia have no tumors. Surgical exploration of such patients should be undertaken only after a careful study leads to a genuine suspicion of a tumor. The other patients can usually be controlled in comfort by the use of special types of diet. Two fundamental approaches are advised: that with frequent moderate sized feedings which furnish sufficient carbohydrate to maintain a satisfactory blood sugar level, or a routine with low carbohydrate and high fat meals, to avoid the vig-

orous stimulation of the production of insulin which may follow too high a carbohydrate intake. The possibility of these symptoms coming from hepatic disease must be kept in mind.

The Adrenal Glands

The adrenal medulla is a specialized portion of the sympathetic nervous system, and the secretion of its hormone, epinephrine or adrenalin, leads to an increased response by the tissues following sympathetic stimulation and to these same responses even without that nervous stimulation. The material acts very quickly and for very short periods after intravenous injection. It is rapidly destroyed after it enters the circulation. Replacement therapy for deficiency of the adrenal medulla is not recognized in modern medicine. The therapeutic use of adrenalin as a vasoconstrictor, antiasthmatic, cardiac stimulant in syncope from certain shocks, et cetera, is a specialized use of a very active principle, but is hardly analogous to the other phases of endocrinology. Excessive epinephrine output probably occurs in unusual tumors of the adrenal medulla.

The adrenal cortex is a typical endocrine gland, the integrity of which is essential for life. Partial deficiencies in its function are very poorly defined although they are suspected in asthenic states. Until more specific diagnostic criteria are demonstrated it is wise to avoid speculation and gland therapy here. The picture of extensive damage to the adrenal cortex is widely recognized as Addison's disease. The discovery of active extracts of the adrenal cortex in the past few years has greatly improved the treatment of the crises of this disease. It is probably life saving to use even the weak commercial preparations now on the market, such as eschatin. Recent reports suggest that more potent extracts, to be used orally, will soon be available. For the present it is necessary that the maintenance of these chronic patients be carried out essentially by the use of increased amounts of sodium chloride and sodium bicarbonate orally, which is only partially successful. For the critical periods the use of the cortical extract should be in doses of 10 c.c. or more daily. It seems increasingly probable that the adrenal cortex will be shown to have more than one function, and to produce more than one hormone. Patients with Addison's disease, es-

pecially when not associated with tuberculosis, need to be studied in institutions prepared for the specialized details and for the expensive therapy involved.

The Testes

There is no longer any doubt that the testis produces two hormones, which are concerned with the accessory reproductive organs and the secondary sex characters, and with the reciprocal control of the pituitary and testes. But to date we have no dependable preparations of these materials for clinical use. Until there are standardized and purified extracts furnished by reputable drug houses, it is urged that the use of testicular hormones be avoided. From what we already know about their action, it is easily possible to do harm by the use of improperly selected extracts. The male climacteric must be treated symptomatically while we wait. Impotence is probably not susceptible to treatment with testicular hormones.

The Ovaries

The ovaries produce two well defined hormones, the follicular hormone which is called estrogenic because it causes the heat reaction or estrus in animals, and the corpus luteum hormone. The estrogenic substance leads to the uterine and vaginal development of maturity, and it is responsible for secondary sex characters. The action of the two hormones is involved in the normal menstruation mechanism, and both are necessary before a fertilized ovum can become successfully imbedded and a placenta formed. Both hormones are essential for the development of the breasts to the point where lactation can be initiated by the pituitary lactation hormone. In practical therapeutics, it is seldom of use to bring about these processes by endocrine therapy, because the necessary production of an ovum is usually also lacking when these processes are absent. The ovum production and liberation cannot be substituted for by the use of ovarian hormones. In fact the use of the estrogenic hormone tends to suppress the functions of the ovary, by inhibiting the pituitary stimulation of the ovary.

There are two recognized functions of the estrogenic hormone in human therapeutics: the relief of climacteric symptoms and the hastening of a cure of vaginal gonorrhea in children. In

the menopause the relief from the nervous disturbances by the daily administration of the follicular hormone preparations is striking, and can be secured in practically all cases. Treatment is best given in one to three doses daily rather than in massive doses at longer intervals. The daily dose should be the minimum which secures control of the easily recognized hot flashes, insomnia, and emotional instability. Oral therapy is now so easy and inexpensive that it is the method of choice. Amniotin, progynon, and theelol are about equally successful, and the cost for effective treatment increases in the order named. Treatment should be continued as long as symptoms recur when the hormone is omitted. The size of the dose can be gradually reduced as therapy is maintained. The material seldom need be used longer than two years. The most effective way of treating gonorrheal vaginitis seems to be by the use of the hormone in gelatine suppositories, administered per vaginam.

The present indications are that the important functions of the corpus luteum hormone include the relief from crampy types of dysmenorrhea and from threatened abortion of some types. There are still no commercially available preparations of this hormone. The materials sold as containing the corpus luteum hormone contain negligible amounts, and should no longer be used for any purpose.

The Pituitary Gland

It is certain that the pituitary gland has numerous functions, and that it produces several hormones. The posterior lobe extracts are useful in the control of low blood pressure in some emergencies, in relief from intestinal atony, in stimulating uterine contractions post partum, and in relief from the polyuria of diabetes insipidus. The later condition is looked upon as a deficiency of posterior lobe secretion. For the clinical control of such polyuria the pituitary material may have to be used from one to four times daily. It is usually used hypodermically. A few years ago it was shown that nasal insufflation of the aqueous extract was successful. More recently it has been shown that the least irritating and expensive method is by the use of minute amounts of dried posterior pituitary powder as snuff. Patients quickly learn to regulate the dosage to the minimum amount and frequency. There is still much debate as to whether there

is any advantage to the use of the fractionated extracts of the pituitary which affect, chiefly, blood vessels or uterus, respectively. Possibly the judicious choice of the dose will still allow optimum results with the U. S. P. solution of posterior lobe.

The anterior pituitary extracts are now known to have a number of different actions. The subject is highly confusing. Before use of any pituitary material, one should be very sure that he knows which activities may be expected from the given extracts. No pituitary preparation should be given to humans until it is available in a standardized solution, *i.e.*, with activity definitely limited in both kind and amount.

The pituitary extracts which will stimulate skeletal growth are now offered by two reputable manufacturers in the United States. It is worth while trying this extract on any dwarf whose epiphyses have not yet united sufficiently to prevent growth of long bones. It appears that not all dwarfism is due to a pituitary deficiency, and only a limited number of dwarfs respond to therapy. We have no way as yet of deciding in advance which types are favorably influenced. Any results are detectable in a matter of a few months. Hypodermic doses of 1 to 2 c.c. of the two extracts now available two to three times weekly seem to suffice. In some cases, results are better from the combination of these extracts with thyroid orally than from either gland product alone.

There is now available one pituitary extract

which is known to stimulate the maturation of the ovaries, the liberation of mature ova, and the formation of corpora lutea. The application of this material to human problems is complicated by the intricacies of differential diagnosis in gynecology. Indications for the use of this pituitary extract, the size and timing of doses, and the choice of hypodermic or intravenous routes of administration—these factors must be studied much longer before any general statements can be made about the proper use of the material. It is probably of help in hypofunction of both the ovaries and testicles, as seen in the Froehlich syndrome and other forms of sexual infantilism. It is recommended that for the present this material (prephysin) be not used except in those clinics where the diagnostic problems can be carefully worked out and the results of therapy checked by special gynecological methods.

Pituitary extracts which will affect the thyroid, the adrenals, the breasts, and other organs are not yet available outside the laboratories for animal work. Particular attention is called to the recent world-wide interest in the possible association of diabetes mellitus and the pituitary. As yet there is no clinical application to be made of these very important laboratory studies on animals. It is not proper that we should attempt radiation of the pituitary for the relief of diabetes. In fact, radiation to reduce or destroy pituitary action is not indicated at present except in the demonstrable presence of certain tumors in the sella.

DEEP ABSCESS OF THE NECK*

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I HAVE chosen a subject which should be of interest to every type of physician, since the doctor in the remotest district, as well as the specialist or internist in the service of the largest hospital, may be confronted at any time by a deep abscess of the neck.

While occasional instances of deep cervical

abscess may occur at all seasons or periods, it has been the writer's experience that such cases are oftenest encountered after epidemics in which the upper respiratory tract and its accessory cavities are acutely involved. And this should be expected, since abscess of this type in every instance is a secondary affection.

While almost any portion of the deep structures of the neck may, under certain unusual

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circumstances, become involved, there are four potential spaces which are most susceptible to infection and abscess, and abscess, when occurring, is nearly always in one or another of these.

The first lies behind the nasopharynx, in front of the vertebral column, and extends from the base of the skull to the mediastinum. Abscess in this region is called *retropharyngeal*.

The second space lies in the floor of the mouth and abscess formation here has received the name of *Ludwig's angina*.

The third space is lateral to the pharynx and lies between the pharynx and the inner surface of the lower jaw. It extends from the base of the skull to the angle of the jaw, is a rather well confined area, suppuration in which is called a *pharyngo-maxillary abscess*.

The fourth space is along the course of the carotid sheath and extends from the angle of the jaw to the mediastinum.

Each of these spaces is separated from the others by a natural barrier, chiefly by some portion of the deep cervical fascia, and hence an abscess in one does not involve another unless the infection breaks through the barrier or is carried through by veins or lymphatics.

The word "space" is an unfortunate one to use in this connection but there seems to be no good substitute. Normally there are no spaces in the neck; certainly no open cavities such as we think of when we think of space. The spaces occur only when certain susceptible areas in the neck are infected and abscessed. The abscess creates the space it occupies by destroying the loose connective tissue present and by pressing aside the adjacent tissues or organs. A space therefore in the sense used here is a region of the neck which contains a good deal of loose connective tissue. The four regions or spaces mentioned above contain more connective tissues than others of the neck and hence are potential cavities in which an abscess can more readily form.

Retropharyngeal abscess nearly always occurs in children. There is a reason. The lymph nodes are better developed in children than in adults. The retropharyngeal nodes are especially well developed in early life but disappear or become atrophied in later life. The pathology is that of an infected lymph node. The result of infection of the node is a breakdown of the

glandular structure with abscess formation. Since the glands involved lie behind the prevertebral fascia the abscess gravitates along the fascia in front of the vertebral column and may reach the mediastinum. There usually is a history of recent inflammation of the nose and upper pharynx but sometimes no such history is obtainable, in which instance the child's symptoms may not at first be properly interpreted. There is stoppage of the nose caused by the pouting of the abscess behind the palate. Difficulty in swallowing is an early symptom and often fluids are rejected. If of nursing age, the child may refuse the breast. There is evidence in the child's appearance of serious illness. There is pain, often difficult breathing and a varying degree of fever. Because of its deep location, there is no external tumor, but on inspection of the throat a midline bulging of the pharynx may be seen. The soft palate may be pushed forward. Palpation of the nasopharynx would disclose the presence of a tumor-mass and perhaps fluctuation could be made out by this maneuver; but palpation of the nasopharynx of infants and young children should not be attempted without excellent reason since the space is small and the passage of the finger into it may split the palate. The writer has seen such mishaps. But should investigation by this means seem necessary and advisable, the precaution of lowering the child's head should not be overlooked, since, should an abscess be present, it may be ruptured by the manipulation of the finger, and, should this happen, immediate gravity drainage is necessary to prevent strangulation.

This type of abscess tends to gravitate down the neck unless checked by inflammatory adhesion. On reaching the level of the larynx, there is likely to be serious interference with breathing, and suffocation from obstruction of the abscess and from laryngeal edema may take place. Spontaneous rupture of the abscess, which may fill the respiratory tract, may also occur at any moment and may suffocate the child.

The affection known as *Ludwig's angina* is confined to the floor of the mouth. The suppuration, if present, is limited to the space bounded by the hyoid bone below, by the tongue above and by the muscles and fascia which comprise the root of the tongue behind. The affection occurs chiefly in adult life. Dental infections and dental operations in the presence of infection are

chief among the causes. Injuries of the mucosa of the floor of the mouth are occasional causes.

The muscular structures of the floor of the mouth rest upon beds of fine, loose areolar tissue that would seem to invite infection. This loose tissue passes from one side of the mouth to the other without meeting the slightest obstruction and hence the disease may begin on one side but pass readily to the other, the spread resulting in involvement of the entire floor of the mouth.

In event the abscess is confined to one side, the tongue is pushed over strongly to the opposite side. If the affection is bilateral the tongue will be crowded against the roof of the mouth and back over the glottis so as to obstruct respiration, sometimes seriously. The mucosa of the floor is greatly swollen and Blassingame speaks of it as sometimes having the appearance of a second tongue. The tongue often fills the mouth so full that the organ shows indentations from the teeth.

Pain in the sublingual region, stiffness of the jaws amounting often to inability to open the mouth, a temperature that may be moderate or high, dyspnea and dysphagia, are chief symptoms. There is a hard swelling under the margin of the mandible, anterior to the submaxillary gland, and this may spread across and occupy the whole region between the jaw and hyoid bone. The swelling is board-like and does not fluctuate externally until late, until it has broken through muscles and fascia and has approached the surface of the neck beneath the mandible.

Phlegmon in the third location I have named is commonly called *pharyngo-maxillary abscess*. This space has been variously described by different writers and its exact whereabouts seems not generally well understood. In simple language it lies between the lateral wall of the pharynx and the inner surface of the mandible and extends from the base of the skull to the angle of the jaw.

The chief site of entrance of infection is the pharyngeal wall, on which sits the tonsil. Tonsillitis or quinsy frequently precede infection of this space. Abscess in this location often follows the removal of the tonsils, especially if the operation is done under local anesthesia. Shapiro has reported 103 cases following tonsillectomy. The blame for such deep infection has been attributed to the manner of injecting the anesthetic

solution. It has been claimed that the needle has been pushed first through the infected tonsil, where the point became contaminated, and that then it was inserted deeper into the space in question, where the infected material was deposited. Shapiro also lays part of the blame on the fluids injected. He made an examination of the solutions used in six hospitals and found four were contaminated. Anatomical study of the pharyngo-maxillary space can leave but little doubt but that infection can easily occur from one or both these sources.

The abscess which characterizes a quinsy always lies close to the pharyngo-maxillary space and may break directly into it. Or the infection may be carried to the space from the primary focus through either veins or lymphatics. In event the venous channel is the carrier, general septicemia usually accompanies the abscess, which, in such instance, may be multiple, the abscess formation often locating in distant parts of the body.

The chief symptoms of abscess in this location are stiff jaws, fever and the presence of a hard lump in the upper neck just posterior to the submaxillary gland. Difficulty in opening the mouth subsequent to infection of some part of the upper respiratory tract, and especially following a tonsillitis or quinsy, should make one think of abscess of the pharyngo-maxillary space. In severe instances the patient may not be able to open the mouth sufficiently to separate the teeth, when, of course, satisfactory inspection of the mouth and pharynx would be impossible.

The temperature may be moderate, 101°-102° F., or it may rise to 104°-105° F. In the higher figures, especially when preceded by chills, thrombosis of a large neighboring vein, often the internal jugular, has probably taken place. Many such instances have been reported and the writer has seen three such complications.

Fluctuation of the tumor at the angle of the jaw has seldom been present, in the writer's experience—at any rate not in the early stages. The superficial and deep layers of the cervical fascia of this region of the neck are dense and unyielding and it is chiefly for this reason that the presence of pus can not be determined by palpation. However, after a variable time the pus may necrose its way through these dense fascial barriers and come near the surface. But it should be emphasized that there are other ex-

its offering less resistance and hence the outbreak is oftener through the wall which separates it from the carotid sheath, on reaching which it will descend along the sheath under cover of the sternomastoid muscle, unless, of course, its downward progress is arrested by inflammatory adhesions.

As stated above, the pharyngo-maxillary space lies near the pharyngeal wall and hence the abscess often points into the lateral wall of the pharynx. This swelling may often be seen in the region of the tonsil, provided the mouth may be opened widely enough to make the inspection. Rupture and drainage in this direction is of frequent occurrence.

Abscess Along the Anterior Space of the Carotid Sheath

Abscess in this location occurs in two ways. First, should pus which has accumulated in one of the other spaces, already mentioned, continue under pressure and unrelieved, outbreak into the loose connective tissue along the carotid sheath may occur. Second, the abscess may follow the infection and disintegration of one of the numerous lymph nodes which lies upon upon the anterior wall of the sheath. All lymph drainage from the head finally reaches this chain of lymph nodes and, following serious infection of the structures higher up, disintegration of one or more nodes is likely to occur.

Abscess in this location is well covered by overlying structures of the neck and hence fluctuation usually is a late symptom. Before it can reach the surface where it may be palpated, the pus must break through dense layers of fascia. I mention this fact and emphasize it for the reason that the necrosis and outbreak of the pus is just as likely to be through the carotid sheath, *inward* instead of outward, and thus to contaminate the contents of the sheath, the carotid arteries, internal jugular vein and vagus nerve. The writer has seen instances of this, and cases of like experiences of others are on record. To await fluctuation for diagnostic or operative purposes seems unwise, therefore, in many instances. It certainly would be unwise if septic fever is already present or is threatened, or if the respiratory function is greatly hindered from mechanical obstruction.

Stiffness of the neck is a symptom more or less common to abscess in any of the spaces

I have mentioned, but it is especially notable in deep abscess along the carotid sheath. The neck may not be twisted or turned without great effort and pain and usually the patient turns his whole body when turning the neck would usually suffice. The writer has seen patients of this type who have been told they had rheumatism of the neck. In such instances the primary infection, the quinsy, the decayed tooth or possibly a mastoid suppuration, occurred several weeks previously and is now forgotten or overlooked. The cervical infection has been slow, the symptoms indefinite and hence when stiffness, hardness, and pain in the neck become severe, the physician may be at a loss to account for them.

The writer has seen deep abscess of the neck that had its origin in the mastoid process. Mastoid extirpation had been performed but pus had already ruptured through the tip and the deep structures of the neck had been involved. The mastoid might have healed but the neck had remained stiff and painful. Such behavior of the pus in the neck (the symptoms at no time having been violent or alarming) had been overlooked until general sepsis from the infection of a vein had taken place or respiratory difficulty from mechanical obstruction had become an alarming symptom. I emphasize these cases since abscess of the neck does not always present alarming symptoms at once and there may be periods when its presence is not easily detected, even by experienced surgeons.

Deep abscess of the neck occasionally follows curious and unexpected routes to the surface where it is discharged. The writer has in mind, especially his own and recorded instances, in which the abscess broke through the deep fascial planes and finally reached the space beneath the cartilage of the external ear, where it ruptured through and discharged into the outer auditory canal. Cures have been reported following this strange procedure.

Perforation of the esophagus is a not uncommon cause of abscess which finds its way to the carotid sheath. The perforation usually results from the passage through the gullet or the lodgment of some sharp object, as a spicula of bone, or from the passage of an esophagoscope or the necessary manipulations in the removal of such an object. It is obvious that in the withdrawal of jagged foreign bodies from the gullet the

wall of the esophagus may be seriously injured or penetrated, even by the most skillful manipulation.

Perforation leads to infection around the gullet and is usually followed by alarming symptoms. If the perforation is below the clavicle, the infection will, of course, be primary in the mediastinum.

Complications and disasters are not unknown as a result of deep abscess of the neck, and especially of the pharyngo-maxillary and pre-carotid spaces. The reason for such complications must be obvious when it is recalled that infection in these latter situations is in close proximity to the internal jugular vein and its tributaries, which are exposed to infection and thrombosis. Of the 100 abscesses reported by Shapiro, there were three of general septicemia, six of jugular thrombosis and one of fatal hemorrhage from the erosion of a large artery. Most surgeons have experienced one or more of these complications. The writer has had two cases of jugular thrombosis occurring in deep abscess of the neck and one case of fatal hemorrhage. During this month (June, 1935) a case of fatal hemorrhage occurred in the Riley Hospital at Indianapolis. The child had had his tonsils removed a month previously; abscess of the neck had followed and at postmortem a rupture of the internal carotid artery was observed. An aneurysmal sac, the point of rupture, lay in a bed of pus and partly organized tissue.

Several instances of fatal hemorrhage from deep abscess have been reported, one, a child, while being hurried to a hospital for treatment.

Edema of the glottis is another alarming complication and may prove rapidly fatal unless promptly relieved.

The almost universal experience among surgeons is that deep abscess of the neck is a dangerous affection unless dealt with promptly by surgical methods. Of course, it is never meant that surgical methods should be undertaken hastily or without rather positive information as to the location of the abscess. But when the affection has been located with reasonable certainty, most surgeons advise that the pus be promptly evacuated. Havens, in a recent article, is opposed to early surgery in deep abscess of the neck and bases his opposition on a study of 103 cases in the large clinic with

which he is connected. Early operation was not practiced but only one death occurred in his 103 cases. This is a better record than most surgeons can produce and is on that account entitled to great respect. Beck reports one death in twenty-four cases of deep abscess. Death, in both the case of Havens and that of Beck, followed jugular vein thrombosis. The percentage of deaths in Shapiro's reports is much higher and it will be noted that in all instances death followed a complication of the abscess.

The writer, in looking back over his experience with deep abscess of the neck, finds that a crisis had often been reached when the operation was performed and that to have awaited fluctuation or further development would have been unwise. Here, as elsewhere, the surgeon must use judgment, but if a deep abscess has been located, the writer feels that in most instances the life of the patient will be more secure if it is relieved by early surgical means.

In case of retropharyngeal abscess in which the diagnosis is made early and the abscess is seen to point in the upper midline of the pharynx, incision in this location is unquestionably the right procedure. To wait, in such instances, permits the abscess to descend in the neck, to obstruct breathing and, if the child survives long enough, to reach the root of the neck. And the same is true of many cases of pharyngo-maxillary abscess. Pus sometimes points on the lateral wall of the pharynx and may often be evacuated while yet in this situation. Since Ludwig's angina begins in the floor of the mouth, the abscess formation is often found pointing toward the buccal surface and can, in such event, be opened into the mouth. But if it be not opened in this situation, or if it does not break spontaneously, sagging of the abscess takes place and it must be opened later by external incision.

An adequate incision from the outside is indicated in all cases where the pus is deeply situated and where no pointing toward the mouth or pharynx can be found. And even when the abscess has been reached in the mouth, it is sometimes advisable to enter from the outside also, and to connect the two openings, since only in this way can the pocketing of the abscess in the neck be adequately drained.

In event the jugular or other veins become

infected or thrombosed, this complication will be announced by the type of fever which immediately comes on. It is of septic type and behaves exactly as does septic fever from other causes, the chief characteristics being chill followed by sudden rise of temperature to 104.5° F., a rapid fall, which is often followed by sweating and prostration. The rise and fall of temperature are repeated in cycles, usually until surgical relief or death occurs. But few spontaneous instances of cure have been recorded. Therefore, should the jugular vein become infected or thrombosed, it is conceded the best and safest practice is to ligate it at once and resect any portion which may be found thrombosed. Excellent results have followed this procedure.

In the event the abscess has broken from its original environment at the floor of the mouth

or in the pharyngo-maxillary fossa and is burrowing its way down the neck along the anterior portion of the carotid sheath, it has been the writer's practice to lay it open by a generous incision along the anterior border of the sternomastoid muscle. Blunt dissection is always employed where possible and the procedure is carried out entirely while working between the fascial planes. A free incision is essential to good inspection of the pathology which may be present, to insure greater ease of the necessary manipulations and to assure a quicker, safer and more thorough operation.

A good knowledge of the fascial planes of the neck, an early diagnosis, the choice of most suitable time for operation and the employment of modern technic in the surgery of deep abscess of the neck will greatly lower the former high mortality of this serious and painful affection.

THE IMPORTANCE OF RADIATION THERAPY INSTITUTIONS IN THE CONTROL OF CANCER*

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CLINICAL investigations in the early diagnosis and treatment of cancer have been and are of the greatest importance in the fight to control cancer. Laboratory researches have, so far, not been fruitful in the determination of the nature of cancer. The solution is bound up with the growth, differentiation and life cycle of normal cells, of which very little is known. Until this is known we can hope to learn little about the abnormal cancer cells.

Mortality statistics place cancer as the second highest cause of deaths. It is natural that the laity is much interested in cancer control and that the medical profession is more than ever endeavoring to attain it. Though the nature of cancer is not as yet known it is known that early diagnosis and immediate and adequate treatment would put us in control of the disease.

Your society has asked me to discuss the treatment of cancer, the organization of treatment centers and the recent developments of radiation therapy.

*Presented before the Minneapolis Surgical Society.

The treatment of cancer is surgical, radiological and medical or subjective and palliative.

Surgical methods of treatment comprise the standardized radical extensive operations whereby the tumor-bearing area is totally eradicated without leaving a single cancer cell behind. This eradication includes the primary growth, the regional lymph nodes and the intervening tissues. Dissection with the steel knife and the electro-tome, including the electrocautery knife and the radio knife and the destruction with chemical agents, heat and diathermy, are all surgical measures. They are indicated if by their use all of the cancer cells can be removed. Otherwise the cancer is said to be inoperable. Inoperability depends on the extent of the growth, the location of the growth, the technical impossibility of removing the growth, and the surgical hazards or risks. It is certain that a growth clearly localized within the organ or tissue of primary origin is operable.

Treatment of cancer by radiation includes the use of radium and roentgen rays. It is indicated if the malignant growth can be tem-

porarily or completely arrested by irradiations without danger to the adjacent normal tissues and organs. This statement implies: (1) the homogeneous application of an adequate radiation tissue dose to the entire growth, the regional lymph nodes and the intermediary tissues; (2) the normal tissues and organs lying within the radiation beams must not be irreparably damaged by the rays; and (3) the treatment must not be dangerous to the life of the patient.

Radiation therapy requires the investment of large amounts of money for radium, appliances for application, transformers and roentgen tubes and the proper housing. It is this question which you have asked me to discuss.

It is evident that the solution of this problem should be sought by the medical profession so it may remain in control of the treatment of cancer. The objective solution, also, should include arrangements for those patients who cannot pay for expensive treatment. The answer to the solution of the problem is therefore twofold: (1) the technical requirements for radiation therapy, and (2) the economic needs involved.

The basic requirement of radiation therapy is a homogeneous distribution of an adequate radiation dose throughout the tumor mass including the growth, the periphery, the regional lymph nodes and the intervening tissues, such as the lymph vessels, the connective and fatty tissues. An adequate radiation tissue dose should represent a known physical and biological quantum of rays. For instance, Quick et al. determined the dose for head, neck and mouth carcinomas to be ten threshold erythema doses or 6,000 r with backscatter applied with 200 Kv. roentgen rays. Lee et al. came to the conclusion that the tissue dose for breast carcinomas is ten to twelve threshold erythema doses of 6,000 to 7,200 r. Schmitz, Pfahler, and others found that the tissue dose for carcinomas of the cervix and corpus of the uterus was about 4.5 to 5 threshold erythema doses or 2,700 to 3,000 r with backscatter. Unless such massive doses are applied to the tumor mass and its extensions or metastases a carcinoma can not be permanently arrested.

There are three methods of applying radiations in deep and massive cancers: the interstitial, the cavitary and the distance methods.

The interstitial method implies the homogeneous implantation of radon gold filtered seeds or radium element platinum cell nests. If the growth is deep seated, operations of access must be performed; thus, the neck glands, the axillary glands, or deep-seated organs should be exposed by operative methods. After the seeds or nests have been implanted, then the skin is closed. Radium cells should be inserted in such a manner that they may be removed. Radon seeds may be left behind. It is obvious that the interstitial method is confined to surface tumors and accessible deeply located tumors.

The cavitary method means the insertion of radium element or radon tubes properly filtered with either 0.5 mm. platinum or 2 mm. brass and 1.5 mm. Para rubber into the tumor mass through natural body channels. The equal intensity curves of such capsules should be known. The cavitary method has been most successfully used in carcinomas of the cervix and the body of the uterus. As 7.5 r represent the physical dose measurement of 1 mg. radium element filtered with 0.5 platinum, applied for one hour at a distance of 1 cm., it follows that 50 mg. applied for one hour, filtered with 0.5 mm. platinum and 1.5 mm. Para rubber, attains at 1 cm. distance a dose of 375 r and within ninety-six hours 36,000 r or forty threshold erythema doses. At 2 cm. distance the dose has been reduced to 9,000 r, and at 3 cm. it is reduced to 4,000 r. As the radium capsule is applied in three intervals, eight days apart, for 3x32 hours, a loss in r must be applied, namely, 35 per cent. Hence, at 3 cm. distance, the dose applied in one sitting would be 2,424 r or four threshold skin doses. These r values are the equivalent of the r obtained with 300 Kv. roentgen rays.

The posterior bladder wall and the anterior rectal wall are about 2.5 to 3 cm. distant from the axis of the cervical canal. The normal mucous membranes of these organs can stand a radiation dose about 20 per cent higher than carcinoma tissue before any permanent and destructive effects are attained. If the bladder and rectum are kept empty, if firm packing is employed to push the bladder and rectum away from the capsule and if palisading or interstitial insertion of radon seeds or radium nests in the paracervical tissues and vaginal contact applications of radium against the cervix as done

in the Regaud method are avoided, then injuries to these organs, such as vesico-vaginal and recto-vaginal fistulae are prevented.

Should one decide to use cavitary radiations in carcinomas of the vagina or rectum, then phantoms of inert material as bakelite should be constructed, having a transverse diameter of 3 cm. in which the radium capsule is placed. Then the same radium doses may be used as found adequate in uterine carcinomas. Otherwise cavitary methods of radiation should not be used.

Distance irradiation means the application of a radiation at a predetermined distance from the body surface. Thereby deep-seated carcinomas may be more homogeneously permeated with rays. Using cross-firing through two or more fields, the summation of the depth doses of the number of fields used will give an idea of the total depth dose attained. Radium cannons are applied at distances of 6, 10, and rarely 15 cm. The deep dose at 10 cm. beneath the body surface and at a focus skin distance of 6 cm. is 9 per cent of the surface dose; at a focus skin distance of 10 cm., it is 23 per cent of the surface dose; at a focus skin distance of 15 cm., it is 31 per cent of a surface dose; and at a focus skin distance of 50 cm., it is 61 per cent of the surface dose. However, similar measurements for roentgen rays show that the deep dose at 10 cm. is 46 per cent of the surface dose with 200 Kv. roentgen at a focus skin distance of 75 cm. and a filter of 1.0 mm. copper plus 1.0 mm. aluminum; and 56 per cent with 800 K.V. roentgen at a focus skin distance of 70 cm. and a filter of 1.5 cm. water, 2.0 mm. brass, 2.0 mm. aluminum, 2 mm. lead, 2 mm. copper and 5 mm. bakelite.

The time required to apply a tolerance skin dose may be read from the accompanying table.

Let us assume that a radium applicator containing 4 grams of radium element was used. Then an application to one field of 10 cm. diameter at 6 cm. focus skin distance would require 30:4 or seven and one-half hours; at a focus skin distance of 10 cm. it would require 60:4 or fifteen hours; at a focus skin distance of 15 cm., 100:4 or twenty-five hours; and at a focus skin distance of 50 cm., 300:4 or seventy-five hours. However, crossfiring should be used; hence the time duration of a complete treatment through two fields must be doubled, through three fields tripled, and so on. If a radium applicator containing 4 grams of radium element were used continuously without interruption day and night, weekdays and holidays, then 171 patients a year could be treated at a focus skin distance of 15 cm., as the year has 357 days of twenty-four hours or 8,565 hours, and 8,565 hours divided by 50, the time duration for two fields, equals 171.

There are on an average 300,000 patients in our country suffering from cancer. As the average duration of life of such patients is about two years, it follows that about 150,000 new patients are seen yearly. It is fair to estimate that about 30,000 of these are permanently cured by some method of radical surgery, and that about 30,000 are too far advanced to offer any hope from treatment. Then 90,000 patients remain who should be treated with radiations. Let us further assume that about 15,000 of these patients could be treated with the interstitial and cavitary methods of irradiation; then 75,000 patients remain requiring distant radiation therapy. As 170 patients can be treated yearly with a 4 gram radium element cannon over two fields at 15 cm. focus skin distance it follows that about 440 stations each supplied with 4 grams of radium

Radiation	Filter	Focus Skin Distance	Deep Dose at 10 cm.	Time	
				Single gram hours	Ten fraction application
Gamma rays obtained from a grm. cl. pack	4.0 mm. Platinum	6	9	24	10x3 gram hrs.
	1.5 mm. Brass	10	23	40	10x6 gram hrs.
		15	31	60	10x10 gram hrs.
		50	61	200	10x30 gram hrs.
Roentgen 200 Kv. at 25 Ma.	1.0 mm. Cu.	75	46	1,370 r	10x200 r
	1.0 mm. Al.				
Roentgen 800 Kv. at 10 Ma.	1.5 cm. Water	70	56	2,000 r	10x280 r
	2.0 mm. Brass				
	2.0 mm. Aluminum				
	2.0 mm. Lead				
	2.0 mm. Copper				
	5.0 mm. Bakelite				

element would be necessary, in the United States alone, to give every patient needing distant radiation therapy an opportunity to avail himself of every possibility in the treatment of carcinoma. The expense of 440 such stations would be 88,000,000 dollars, not counting the housing and the expensive machinery to suspend and operate the heavy lead housing. To save time and also expense of attendants, stations could be equipped with 20 or 24 grams radium element and then eighty-eight or sixty-four stations should be distributed through the country in proportion to population per square mile.

Similar reasoning applied to 800,000 volt roentgen installations would give the following results: If it is run for eight actual working hours for five days a week, then forty treatment hours would be attained weekly or 2,080 hours yearly. Using the fraction method of ten treatments to each of two fields it would require 160 minutes, or in round numbers about three hours, for each patient or 360 patients a year if the treatment factors are used as given in a preceding paragraph. However, the apparatus could be used in two shifts or the ampere load could be increased from ten to twenty milliamperes. In other words, the output would be doubled and 720 patients could be treated yearly. It means that 104 roentgen stations could meet all the requirements of distant radiation therapy in our country. An installation of this kind, including buildings, would cost 50,000 to 60,000 dollars. Hence the total outlay for the entire nation would be 5,200,000 to 6,240,000 dollars.

The population of our country is about 130,000,000. If this number is divided by 720, the number of cancer patients requiring distant radiation therapy per station, then it follows that for each 1,800,000 people a radiation institute would be desirable. It would be uneconomical to install more institutions than needed. This is a very important matter, as it concerns, chiefly, the medical profession, which probably will bear or provide the money. If physicians desire to keep the treatment of cancer under their control, then they must find the most economic ways of accomplishing this solution. We should move slowly but positively. Perhaps a 500,000 volt roentgen may suffice to do the work and then a great saving in money would result. Fortunately, apparatus to deliver 400 to 500 Kv. roentgen rays have also been installed in several cities.

The medical men in charge of such institutions should serve the patients and the medical profession, and their sole means of remuneration should come from the institutes. They must never become competitors of the profession by doing private work.

The discussion has considered the motives that led my group to do and plan some of the pioneer work in the treatment of cancer. The solution also included a study of the most economic and effective methods of applying radiations. If the presentation will aid you in solving this problem efficiently and adequately for your state, I shall feel very happy at having been your guest.

DEVELOPMENT AND TREATMENT OF CANCER OF THE STOMACH*

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THE results of surgical treatment of localized cancer of the stomach have been excellent. When in a group of 1,000 such cases, 50 per cent of the patients are living and well after three years, the value of early recognition of the presence of such lesions is evident. When skillful roentgenologists are able to demonstrate the

presence of gastric lesions as small as 1 cm. in diameter, and in many such cases to designate whether the lesion is benign or malignant, the roentgenologic method of examination is the outstanding contribution to the early recognition of gastric lesions. Although there is a certain percentage of error in the roentgenographic identification of the type of gastric lesion present, and likewise at operation distinction between

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small benign and small malignant lesions is frequently uncertain until microscopic examination has been made, it is proper to regard all gastric lesions as malignant until they are proved to be otherwise.

The lesions concerning which error most frequently may arise are the small, ulcerating ones, and infrequently the gastric polyp. As a basis of comparison, if such lesions are malignant, they might be classified as "developmental" carcinomas, whereas more extensive, infiltrating lesions, which have no ulcerative features, might be considered to compose a group of "original" carcinomas. The saddest feature of many original carcinomas of the stomach is their symptomless rapidity of growth; they may fail to manifest their presence until symptoms of obstruction have occurred, or until extension of the lesion to adjacent structures produces abdominal pain. It is probable that this type of lesion can be recognized early only by frequent, routine, fluoroscopic and roentgenographic examinations of the stomach, and I should like to suggest that all patients, who are more than forty years of age, should, at the time of their periodic health examinations, be subjected to fluoroscopic examination of the stomach and roentgenographic examination of the colon, particularly if the patients complain of persistent dyspeptic discomfort.

It is worth while remembering that malignant lesions occur much more frequently in the stomach than in any other part of the gastro-intestinal tract and that they occur there three times more frequently among men than among women. Although statistics and experimental studies of cancer might lead to the assumption that cancer is not hereditary, yet I think all physicians have been impressed by the frequency with which patients who do have cancer have known of other members of their families having had malignant lesions also. It would appear, therefore, that people who have such hereditary tendencies should be subjected to the most painstaking search for malignant lesions at the time of their periodic health examinations. Fortunately, most patients who have cancer of the stomach do have symptoms which should lead the physician to suspect the possibility of the presence of abnormal gastric physiologic processes.

It is particularly interesting and noteworthy

that a great many patients, who are found, on roentgenologic examination, to have cancers of the stomach, have been treated medically for many months on the basis of a clinical diagnosis of peptic ulcer, because of similarity of symptoms to those of peptic ulcer, and, in most such cases, the medical treatment has been instituted and carried out without fluoroscopic or roentgenographic examination of the stomach. The corollary of this is obvious; namely, that a patient who has symptoms of dyspepsia, no matter how closely they resemble the clinical syndrome of benign peptic ulcer, should not be treated medically without fluoroscopic examination to confirm the diagnosis, and even then, if the lesion is reported to be a gastric ulcer, the possibility, indeed the probability, of it being malignant should lead to immediate surgical consultation. I believe the statement is justified that the report of a malignant lesion of the stomach, made by a competent roentgenologist, is almost certain to be accurate, but that the report of a gastric ulcer made by a roentgenologist, or even by a surgeon who actually sees and feels the lesion at the time of operation, does not exclude the possibility that the lesion may be carcinomatous. Several years ago McVicar called attention to the fact that an ulcerating lesion of the stomach, which disappeared following a course of medical treatment, could not always be assumed to be benign, for he found that many patients who had ulcerating lesions of the stomach might respond temporarily to medical treatment, even when the process was malignant. To consider such disappearance of a lesion as a criterion that it is benign may cause delay in attacking the lesion surgically, and it may allow an operable lesion to proceed to inoperability. There is no doubt that medical treatment of many benign gastric ulcers, by internists skilled in treatment of gastro-intestinal disease, is worthy of trial for certain types of gastric ulcer, particularly when the condition is acute and the patient is young, or when the patient is elderly and constitutes a poor surgical risk. This treatment should be attempted only when the patient can be kept under observation for several months. It should be emphasized that the decision to treat such a person by medical measures carries great responsibility, for, if the lesion is malignant, by the time it has been found to respond unsatisfactorily to medical treatment,

sufficient time may have elapsed for it to have become unremovable. I vividly recall one patient who had a gastric ulcer and who was being treated medically. Pain was relieved, blood disappeared from the stools, and the niche disappeared on roentgenologic examination. Ten months later, however, symptoms reappeared. The roentgenogram revealed the lesion, exploration was made, and an extensive, inoperable malignant lesion was found, from which the patient died a few months later.

Gastric polyps, like polyps of the colon, are usually malignant. Their presence is usually associated with absence of free hydrochloric acid from the gastric secretion, and frequently they bleed to the extent that a mistaken diagnosis of pernicious anemia has been made and treatment carried out without roentgenologic examination of the stomach having been made. In cases of marked anemia seen at the clinic, even though apparently of the primary type, fluoroscopic and roentgenographic examinations of the stomach are routine procedures in examination, and the number of patients who have had bleeding gastric polyps has been surprising. When such polyps have been removed, specimens from various portions of them, from the periphery as well as the stalk, should be carefully examined microscopically. In many seemingly benign gastric polyps which have been removed at the clinic, peripheral secondary cytoplasia has been found.

The Development of Cancer of the Stomach

Secondary cytoplasia* might be defined as that change in cellular constituents of an abnormal lesion which would appear to be the intermediary stage between benign and malignant reactions. In this respect, the abnormal increase in the size of the nuclei of such cells would seem to be of great importance, as has been reported by MacCarty, Haumeder and Berkson, and Raaf. Recently the last-named investigator, working in The Mayo Foundation, has made studies of secondary cytoplasia in 120 cases of gastric ulcer, in eighty-seven cases of duodenal ulcer, and in twenty-two cases of duodenitis. As controls, thirty-four specimens of normal gastric mucosa were studied. There were atypical, hyperplastic cells in the mucosa bordering ap-

proximately 20 per cent of the seemingly benign gastric ulcers, and it was concluded that gastric cancer cells and atypical hyperplastic cells* in a gastric ulcer are morphologically indistinguishable. In specimens of early cancer on ulcer, atypical hyperplastic cells were found in the gastric mucosa adjacent to the cancer. The occurrence of this atypical hyperplasia in ulcerating lesions paralleled the age incidence and the sex distribution as well as the duration of symptoms similar to proved cancer on ulcer. This study would seem to add weight to the conclusion that lesions in which there is atypical hyperplasia are early cancerous ulcers and that when they are encountered a mistaken diagnosis of a benign ulcerating gastric lesion may be made because of failure to examine all quadrants of the ulcer microscopically.

The Treatment of Carcinomatous Lesions of the Stomach

There is no necessity to uphold the statement that the proper treatment for carcinoma of the stomach is surgical removal whenever possible. It is proper, I believe, to advance further and to say that every patient who has cancer of the stomach, regardless of how extensive, should be allowed the benefit of surgical exploration of the lesion providing distant metastasis is not demonstrable. In a group of 170 patients operated on at the clinic in 1933, for cancer of the stomach, the lesions of sixty-nine patients were removed by partial or total gastrectomy. In thirty-seven of these cases the carcinoma, by fluoroscopic and roentgenographic examination, appeared to be very extensive, and such examinations seemed to indicate that the lesion was of doubtful operability or wholly inoperable. Yet, in 50 per cent of these thirty-seven cases, the lesion was removed successfully.⁸ I would estimate that in 10 to 15 per cent of those cases in which the lesion, on roentgenologic examination, would appear to be inoperable because of its extent, surgical removal of the lesion can be accomplished. Large malignant lesions of the stomach will often be found to be of low degree of malignancy, to be sharply demarcated, and to present no involvement of lymph nodes. Removal of such lesions by partial gastrectomy gives a high incidence of permanent cure and this is particularly true in cases in which the patients are elderly.^{6, 9} In general, I believe that

*The terms secondary cytoplasia and atypical hyperplasia of cells are synonymous.

an increasing number of malignant lesions of the stomach are being removed, for in 1934 in 231 cases of carcinoma of the stomach operated on at The Mayo Clinic the lesion was removed in 101 by partial, subtotal or total gastrectomy. The finding of an extensive carcinoma, localized in the stomach, or even of one associated with involvement of lymph nodes, is viewed from the standpoint that unless the lesion is removed the patient is doomed to early death. Balfour has shown that when the disease is confined to the stomach, 50 per cent of the patients who have carcinoma of the stomach which has been removed by partial gastrectomy, have lived for three years or longer, and that even when extra-gastric involvement has taken place, 19 per cent of the patients have lived three years or more following resection.

In several cases total gastrectomy^{5,6,7} has been performed successfully at the clinic, and patients have lived and been comfortable two and three years subsequently. That such an operative procedure can be carried out in suitable cases with great benefit to the patient has led to the impression that all gastric lesions should be removed unless they have invaded adjacent structures to the extent that the carcinomatous process cannot be removed in its entirety. At operation, in many instances in which the lesion at first would appear not to be susceptible of removal because of its extent and attachment to the mesocolon and to the capsule of the pancreas or liver, it is found that, after freeing of adhesions and separating the lesion from these structures, the growth is readily removable. In other cases, particularly if the tumor is large, the uninvolved portion of the stomach may be thickened to give the appearance of involvement, yet the thickening may be only the result of gastritis adjacent to the lesion. It is not an uncommon experience to find that a growth which is examined while the patient is straining under light anesthesia appears to be unremovable, but under deep anesthesia may be seen to be readily removable. In several cases involvement of the transverse mesocolon has given, at first, the appearance of inoperability, yet it usually is the avascular portion of the mesocolon that is involved, and this portion can be removed with the carcinoma, without interfering with the blood supply of the colon.

The Influence of Age on Operative Risk

I believe it is worth while emphasizing to patients who are in the sixth, seventh or even eighth decades of life that they frequently stand operative procedures of great magnitude as well as younger individuals. In one of the two cases in which I have successfully performed total gastrectomy for carcinoma, the patient was a man sixty-nine years of age, and he was living and well two years later. Two years ago I performed subtotal gastrectomy on a patient who was eighty years of age, and he has been free of recurrence since that time. I recall many cases in which patients in the sixth and seventh decades of life were operated on successfully, and in which extensive gastric resections were carried out successfully with a risk no greater than that attending resections of average extent among much younger patients. A corollary of this is that it is not the age of the patient but his general condition that is a factor in the surgical mortality.

Technical Procedures Assisting in the Removal

I have found it of value to approach all extensive lesions of the stomach through a left rectus incision, as suggested by Balfour. Such an approach enables the surgeon to attack the upper part of the stomach with much greater ease than through an incision in the median line. Resection is begun by dividing the duodenum just below the pyloric sphincter and by reflecting the stomach upward, removing all of the gastrohepatic omentum and as much of the gastrocolic omentum as may be indicated to a point well above the lesion. If it is desired to perform a Polya type of anastomosis, the jejunum is sutured to the posterior wall of the stomach at this high level before the growth is removed; this enables the surgeon to remove a large part of the stomach, or even the entire stomach when necessary, with greater ease and safety than by removing the lesion first, using a crushing clamp to close temporarily the proximal end of the stomach. Among fleshy individuals particularly, removal of all the gastrocolic omentum to the site of resection assists materially in the ease with which reconstruction anastomosis can be carried out and, at the same time,

more completely removes any involved lymph nodes along the greater curvature.

In general, a posterior Polya, or an anterior Polya-Balfour, type of anastomosis is the most satisfactory type of reconstruction following extensive gastric resection for malignant disease. However, in certain instances I have found that the original method of Billroth, in which the stomach and duodenum are anastomosed, has worked out to advantage, although the greatest field of its applicability is in the presence of benign gastric ulcers, bleeding duodenal ulcers, and recurring ulcers. This particularly is true of small lesions localized high on the lesser curvature of the stomach, removal of which can readily be effected by excising a large portion of the lesser curvature and its omentum. By preserving a large amount of the greater curvature of the stomach, direct anastomosis with the duodenum can be accomplished in less time than is required for the Polya anastomosis, and there is one less area for suturing. When extensive gastric resections have been performed on elderly patients, particularly in the case of subtotal or total gastrectomy, jejunostomy as a means of providing a temporary method of feeding has a decided advantage, for nourishment can be administered directly into the jejunum, through a tube, for as long a time as necessary; during this time oral administration of fluids is restricted, to assist in healing of the anastomosis. This is of particular value for patients who have lost a considerable amount of weight and who have been debilitated as a result of carcinomatous obstruction.

Summary

The presence of abnormal gastric lesions as small as 1 to 1.5 cm. in diameter can be detected by a competent roentgenologist. Many small lesions of the stomach, which appear to be benign on roentgenologic examination, and even at the

time of operation, have proved, microscopically, to be malignant. Recent work by Raaf, of The Mayo Foundation, disclosed a definite type of cell, with an unusually large nucleus, which appears to be an intermediary stage between the cells of benign and malignant ulcerating lesions. Such cells have been described by MacCarty and Raaf as showing "secondary hyperplasia" or "atypical hyperplasia."

In view of the successful removal of the entire stomach in certain cases, as well as in cases in which successful subtotal gastrectomy has been performed for malignant lesions, it is reasonable to assume that most malignant lesions localized in the stomach should be removable. Fifty per cent of the patients from whom localized lesions of the stomach have been removed have been found to be living three years or longer after partial gastrectomy. Regardless of the extent of a lesion of the stomach in roentgenologic examination, in the absence of demonstrable metastasis, the patient's general condition permitting, exploration of the lesion should be carried out. Of thirty-seven cases reported by the roentgenologist as being of border-line operability or inoperable, in eighteen, or 50 per cent, the lesion was successfully removed.

Bibliography

1. Balfour, D. C.: Curability of cancer of the stomach. *Surg., Gynec. and Obst.*, 54:312-316, (Feb.) 1932.
2. MacCarty, W. C., Haumeder, Eva, and Berkson, Joseph: A differential characteristic of malignant cells: preliminary report. *Proc. Staff Meetings of Mayo Clinic*, 8:38-45, (Jan. 18) 1933.
3. McVicar, C. S.: Quoted by Balfour.
4. Raaf, J. E.: Personal communication to the author.
5. Walters, Waltman: Physiologic and chemical studies following successful total gastrectomy for carcinoma. *Jour. Am. Med. Assn.*, 95:102-106, (July 12) 1930.
6. Walters, Waltman, and Priestley, J. B.: Total gastrectomy and other extensive gastric resections in elderly patients. *Proc. Staff Meetings of Mayo Clinic*, 6:49-53, (Jan. 28) 1931.
7. Walters, Waltman: Total gastrectomy for carcinoma; physiologic and chemical studies during a period of two years following the operation. *Jour. Am. Med. Assn.*, 100:804-806, (March 18) 1931.
8. Walters, Waltman: The present status of gastric surgery. *Jour. Med. Assn. of Georgia*, 23:369-378, (Oct.) 1934.
9. Walters, Waltman: The treatment of extensive malignant lesions of the stomach. *Jour. Am. Med. Assn.*, 103:1345-1348, (Nov. 3) 1934.

STERILITY: A CONSIDERATION OF ITS ETIOLOGY AND TREATMENT*

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THE recent changes in our concept of the problem of sterility are worthy of consideration. The older concept usually placed the blame of a sterile union upon the wife. Most often she was believed to have a stenosed cervix and an unhealthy endometrium. Not infrequently her vaginal secretions were thought to be so strongly acid that they destroyed the invading spermatozoa. When a retroverted uterus was discovered, it was believed to prevent conception mechanically. Her general poor health frequently was blamed for her barrenness. The most common treatment was a dilatation and curettage to provide unobstructed passage for advancing spermatozoa and a healthy bed for the fertilized ovum. Alkaline douches often were advised to counteract hostile vaginal secretions. Tonics usually were prescribed to improve her health. Frequently, the "tipped uterus" was "straightened" by an operative procedure. After such empiric treatment, patient and physician waited on time and circumstance and hoped for the best.

The modern concept of sterility recognizes that either husband or wife may be responsible for childlessness. It acknowledges that frequently both of them are of low fertility. It admits that usually there are multiple causes, instead of a single cause, for almost every sterile union.^{1,2} Thus increasing knowledge of the multiple factors involved leads to a more complete investigation of both partners.³ Treatment then is directed along more intelligent lines.

More careful study, on the other hand may lead to the discovery of such absolute barriers to conception as azoöspemia in the male, or closure of the interstitial portions of the fallopian tubes in the female and point out the hopelessness of treatment in such cases.

Male Factors in Sterility

The wife is the partner of an infertile union who usually consults the physician. A careful search will be made, consequently, for female

causes of sterility, but when one realizes that in 30 per cent of sterile unions the husband produces an inadequate semen, one will not neglect the two tests necessary to prove his virility before proceeding to more complicated investigations and to unnecessary therapeutic measures for the wife.

The examination of a condom specimen of semen one or two hours old, kept at body temperature after ejaculation, will yield valuable information. The quantity of a normal specimen should be 4 c.c. or more. A drop of semen on a warm slide should show a preponderance of motile spermatozoa under the microscope. A spermatozoa count, made as one counts leukocytes, but using normal saline solution as a diluent should number from 70,000,000 to 200,000,000 spermatozoa per c.c.⁴ A drop of semen mixed with a drop of hematoxylin and examined for variations in morphology should reveal less than 20 per cent of abnormal spermatozoa. Abnormality may be judged by the size of sperm heads, which may be too large or too small, by the deformity of sperm heads, and by the deformity, duplication or absence of tails. The finding of numerous pus cells in a condom specimen will indicate a chronic lower genito-urinary infection of gonorrheal or other origin which may be the primary cause of lowered fertility.

Post-coital examination after Hühner's method should supplement examination of a condom specimen. For this test the wife will be asked to report to the physician one or two hours after coitus. Specimens are obtained from the vaginal pool and from the cervical canal by suction with a rubber bulb attached to a pipette introduced into the vagina through a Graves speculum. Microscopic examinations of both specimens are made. A normal vaginal specimen may or may not reveal motile spermatozoa. A normal cervical specimen will show many active spermatozoa. When the condom specimen has shown abnormalities, the finding of a preponderance of dead spermatozoa in the cervical specimen will confirm the diagnosis of lowered male fertility. When, however, the condom specimen has been

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normal and the post-coital specimen from the cervix abnormal, a search must be made for causes of hostile cervical secretions in the female.

Subnormal fertility in the male as discovered by the two tests just described may be due to a residual prostatitis and vesiculitis following gonorrhea. It may be due to focal infections or chronic intoxications. Not infrequently it is due to endocrine disturbances with or without an associated low basal metabolic rate.

Female Factors in Sterility

A consideration of the female causes of sterility presents a more complex problem. By far the greatest number of sterile women owe their plight to the effects of acute and chronic infections involving the fallopian tubes and/or the cervix. Some of them will have had acute appendicitis; others will have had induced abortions;¹⁶ the largest number of them will have had gonorrhea. Polak's observation that 90 per cent of women who do not conceive are married to men who have had gonorrhea at one time or another is startling and significant. The statement does not imply that all these women are sterile because of gonorrheal infection. It does emphasize the importance, however, of searching for other causative factors in the 50 to 70 per cent of cases in which the sterilizing effects of gonorrhea are not demonstrable.

Cervical infections of gonorrheal or other origin will usually be revealed by speculum examination of the cervix. Endocervicitis and cervicitis are characteristic in appearance. Sometimes, however, an innocent appearing, small external os will exude purulent mucus when it is dilated and the spacious cervical canal behind it is probed. Such hidden infections of the endocervix are commoner than one would suspect. The hostile secretions resulting from a diseased endocervix usually account for the dead spermatozoa found on post-coital examination when a condom specimen has indicated normal male fertility.

In addition to gonorrhea, cervical injuries from such operative procedures as induced abortion, therapeutic dilatation and curettage and the crippling Dudley wedge-shaped excision of a portion of the posterior lip of the cervix, formerly done for dysmenorrhea, are important

causes of endocervicitis bearing on a subsequent sterility.

In the absence of demonstrable cervical infection, or after it has been remedied, tubal integrity may be investigated by transuterine insufflation, using some method similar to that first devised by Rubin. A simple apparatus for this test consists of two parts: (1) a metal cannula with a curved, fenestrated tip over which a canalized rubber "acorn" has been slipped to block the external os; (2) an attached tubular Y-shaped metal connection, one branch of which is connected to a manometer, the other to a rubber bulb from which air is to be forced into the uterine cavity. During the test, the patient will complain of pain when traction is made on the anterior cervical lip and counter-traction on the rubber "acorn" by means of single-toothed tenacula. She will have abdominal cramps when air is injected under pressure. In spite of these discomforts, most patients will submit to the test in the office. A few nervous patients will require gas anesthesia for the procedure.

Varying degrees of tubal patency will be evident from the following observations made during a Rubin test:

1. There will be a sudden fall of pressure after the manometer reading has risen to from 40 to 200 mm. of mercury. This change is due to air passing into the abdominal cavity.
2. Bubbling sounds will be heard through a Bowles stethoscope, the bell of which has been placed over the lower abdomen. Such sounds are attributed to air passing through the fimbriated ends of the tubes.
3. Pain in the shoulder will be complained of after completing the test. This pain is due to the injected air in the abdominal cavity rising to the diaphragm as the patient sits up. It is usually felt in the right shoulder and may be intensified by having the patient breathe deeply.
4. Finally, when the physician is in doubt, a clear space of air beneath the diaphragm, present when the patient is in an upright position, may be demonstrated fluoroscopically or on an x-ray film.

A Rubin test which seemingly shows non-patency may be due to tubal spasm. This condition can be ruled out by repeating the procedure after giving the patient atropine or belladonna. A repeated Rubin test which reveals

non-patency may be supplemented by the visual evidence of radiographs of the uterus and tubes taken after they have been injected with iodized oil. Such localization of tubal stenosis should surely be done if a corrective operation is contemplated.⁵

Chronic pelvic congestion is a less common factor in sterility. Nevertheless it is sometimes important. It may have a functional basis and be the result of sexual maladjustments such as sexual excesses, deprivation or incomplete orgasm of the wife. More commonly, however, it has a pathological basis. Malpositions of the uterus *per se* do not cause it. But the sterile patient with a retroverted, hypermobile, boggy uterus who complains of backache, of bearing-down pains before menstruation and of leukorrhea will frequently have cystic, thick-capsuled ovaries interfering with ovulation and therefore will be sterile.

Endometriosis is an occasional factor in sterility. It also produces pelvic congestion with its attending symptoms. In addition, it produces a peritoneal irritation with resulting adhesions which mechanically interfere with fertility.

Of the pelvic tumors, myomata of the uterus are the ones most commonly associated with sterility. Although the relationship is not well understood, probably 30 per cent of women with myomatous uteri are sterile. In some of them sterility may be due to mechanical obstruction by submucous growths. In others, the frequent association of cystic ovaries with myomata may be the important factor in lowering fertility.

Our rapidly advancing knowledge of endocrinology indicates that as many as one-fourth of sterile marriages present functional factors as causes.¹ There is a group of women whose genital organs have failed to develop adult characteristics under the stimulus of puberty. These women have poorly differentiated labia minora and rather sparse genital hair. Their vaginas are short and sometimes narrowed toward the fornices. Their cervixes are long and pointed or they may be small, round and button-like. Acute antelexion of the uterus with a shortened anterior vaginal wall or retroversion is usually present. The uterine index, as determined by introducing a graduated sound into the uterine cavity and comparing the lengths of the cervix and the body of the uterus, shows a ratio nearer

that of a child, which is 2 to 1, than of a mature woman, which is 1 to 2.^{7,9}

From an endocrine point of view, women with faulty genital development belong in two classes: (1) those having primary pituitary deficiencies; (2) those having primary ovarian deficiencies. The former class is identified by such additional stigmata as girdle obesity and excessive hairiness including male distribution of pubic hair. Examination of their blood usually shows prolactin to be absent. Ovarian function is suppressed with oligomenorrhea and amenorrhea resulting.

Women in the class having primary ovarian deficiencies also show genital hypoplasia but are otherwise highly feminine in their physical development. They have full breasts, broad hips and a female distribution of pubic hair. The normal amount of prolactin is usually present in their blood. They have menstrual disturbances similar to those noted in pituitary deficiency.

There are a few women with ovarian deficiency who menstruate normally or somewhat profusely but do not ovulate. Novak has observed that this anovulatory type of menstruation so common in monkeys also occurs in women.^{11,12} These women are sterile because they do not give off ova for fertilization. Furthermore, with no corpora lutea being formed, no progesterin will be produced and the secretory type of endometrium normally developed just before menstruation and so necessary for implantation will not be present. Microscopic examination of bits of endometrium removed with a small curette premenstrually will reveal the deficiency and lead to the diagnosis.

Hypothyroidism accounts for another group of women with endocrine deficiency resulting in sterility.³ Women in this group usually have normally developed genitalia and normal secondary sex characteristics. They usually have dry hair and skin; they are sensitive to cold; they tire easily. They often have menstrual disturbances characterized by alternating amenorrhea and menorrhagia. Sometimes none of these signs or symptoms are marked enough to attract attention until a metabolic test reveals a lowered basal rate.

Treatment

After all possible etiologic factors have been discovered and evaluated, treatment will be directed specifically toward each.

When chronic prostatitis and vesiculitis are discovered in the husband, a course of prostatic massage should be given.¹⁴ Foci of infection should be removed and sources of chronic intoxication such as alcohol and tobacco should be eliminated. The administration of desiccated thyroid orally is helpful in improving deficient semen but the administration of other endocrine preparations has been thus far disappointing.²

In dealing with the female factors of sterility, more specific measures are available. Treatment of endocervicitis in the wife yields the best results, and treatment of non-patent fallopian tubes, the poorest. Judicious linear cauterization of lacerated cervixes and infected cervical canals will restore most of them to normal with slight danger of subsequent stenosis. A few badly lacerated cervixes will require plastic operations; the occasional type of infected cervix presenting a "pin-hole" external os may require incision of the posterior lip or lateral incisions to facilitate drainage. This minor operation often can be done with a cautery tip in the office.

When fallopian tubes are totally blocked by previous inflammation, treatment is usually hopeless. Repeated insufflations of air with a pressure never exceeding 200 mm. of mercury may break down light adhesions in a few cases and reestablish patency. Those rare cases in which the injection of iodized oil has shown the obstruction to be at the fimbriated ends are frequently amenable to operative intervention.

Chronic pelvic congestion occasionally subsides when a retroverted uterus is corrected bimanually and held in place with a pessary but more often operative correction is necessary. The uterus should be suspended by some simple procedure such as Olshausen's operation. Cysts of the ovaries should be ruptured or resected as indicated.

When pelvic endometriosis is the cause of sterility, operative procedures will usually be more radical and the outlook for fertility poorer. When myomata of the uterus are sterility factors, myomectomies and the operative treatment of associated pelvic disease are indicated.

The treatment of endocrine factors in sterility is still in an experimental state but offers great possibilities for the near future. Theoretically, repeated stimulation with preparations of prolactin in the hypopituitary group, and with progesterin and estrin in the ovarian group should

affect low fertility favorably. Practically, only thyroid medication in the hypothyroid group, and sometimes in the other groups showing a lowered basal metabolic rate, has been encouraging.^{3,13}

Some favorable effects in endocrine deficiencies have been reported by using small, repeated stimulating doses of x-rays (usually as small as one-tenth of an erythema dose) to the ovaries, the pituitary gland and sometimes to the thyroid gland.^{6,10}

Cases in which no causes for sterility can be found are not hopeless.⁵ As many as one-third of these matings will become fruitful when general instructions as to hygiene and diet are followed. These instructions should include such measures as periods of continence with coitus limited to the fertile period of the menstrual cycle;¹¹ psychic stimulation by encouraging both husband and wife to study the physical and emotional aspects of their mating; sufficient rest and exercise; and the ingestion of a diet high in proteins, mineral salts and vitamins, particularly vitamin E. Regulation of diet frequently will include the problem of treating an unfavorable obesity.

The search for etiological factors and the treatment of sterility are often tedious and discouraging. But when one realizes that a better understanding of the problem has increased cures from 13 per cent to from 30 to 50 per cent in cases not showing absolute barriers to conception, it becomes a problem well worthy of our attention.

Bibliography

1. Bland, P. B., and First, A.: The modern concept of sterility; analysis of 100 cases of functional sterility. *Internat. Clin.*, 4:197-220, 1934.
2. Charney, C. W.: A clinical study of male sterility with particular reference to endocrine dysfunction and therapy. *Jour. Urol.*, 32:217-230, 1934.
3. Litzenberg, J. C., and Carey, J. B.: The relation of basal metabolism to gestation. *Am. J. Obst. and Gynec.*, 17:550-552, (April) 1929.
4. Macomber, D., and Sanders, M. B.: The spermatozoa count; its value in the diagnosis, prognosis and treatment of sterility. *New England Jour. Med.*, 200:981-984, (May 9) 1929.
5. Mazer, C., and Hoffman, J.: Female sterility: an analysis of five hundred cases from the Department of Gynecology of the Mount Sinai Hospital of Philadelphia. *Med. Jour. and Rec.*, 129:90-94, (Jan.) 1929.
6. Mazer, C., and Spitz, L., Jr.: The therapeutic value of low dosage irradiation of the pituitary gland and ovaries in functional menstrual disorders. *Am. Jour. Obst. & Gyn.*, 30:214-220, (August) 1935.
7. Meaker, S. R.: A uterine index of development; the definition of a new diagnostic sign. *Boston Med. and Surg. Jour.*, 196:615-616, (April 14) 1927.
8. Meaker, S. R.: The need for complete investigation of cases of sterility. *Jour. Med.*, 11:354-364, (Sept.) 1930.
9. Meaker, S. R.: Human sterility. *Balt., Williams and Wilkins*, 1934, pp. 121-123.
10. Miller, C. J.: The treatment of sterility by roentgen ray

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- therapy. *Internat. Surg. Digest*, 5:323-327, (June) 1928.
11. Novak, E.: Two important biologic factors in fertility and sterility: (a) Is there a "safe period"? (b) Anovulatory menstruation as a possible cause of sterility. *Jour. Am. Med. Assoc.*, 102:452-454, (Feb.) 1934.
12. Novak, E.: Endocrine mechanisms in certain functional gynecological disorders. *Surg., Gynec. and Obst.*, 60:330-340, 1935.
13. Randall, L. M.: Primary infertility associated with lowered rate of metabolism; report of a case. *Proc. Staff Meet., Mayo Clin.*, 9:206-208, (April 4) 1934.
14. Read, J. S.: Sterility in the male. *Jour. Urol.*, 31:411-417, 1934.
15. Rowe, A. W.: Some constitutional factors in human sterility. *Proc. 2d Cong. Sex Research*, pp. 534-554, 1930.
16. Rubin, I. C.: Sterility secondary to induced abortion; with special reference to the tubal factor. *New York State Jour. Med.*, 31:213-217, (Feb. 15) 1931.

STILLBIRTHS*

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DELEE in his book on Obstetrics makes this statement: "Ideal obstetrics demand that every child not congenitally deformed be delivered alive and absolutely uninjured." This ideal is far from being realized.

In 1877 Dr. Schultz estimated that 5 per cent of children are stillborn and 1.5 per cent die shortly after labor as a result of trauma. Fifty years ago there were no prenatal clinics. The laity knew very little about focal infections, toxemias, etc., and the majority of women were attended at best by a midwife, seldom by a doctor. Under these circumstances, we might reasonably expect a high fetal and neonatal mortality rate. During the past twenty-five years prenatal clinics have been established in all the larger cities, city and county nurses employed, and child welfare societies have been instrumental in disseminating a great deal of valuable information to the expectant mother.

These various activities have, no doubt, had some effect in reducing the neonatal death rate, but if we can rely on statistics, our stillbirth rate remains the same, and, I believe, if an accurate count could be made, is rather increasing, and is a problem of greater magnitude than that of neonatal deaths. It is rather difficult to arrive at a true estimate of the stillbirth rate, due to the fact that registration has not been complete in all the States, and the definition of stillbirth is rather vague.

Dr. Lyon of New York classifies as stillbirths all those cases in which the baby never breathed, even though the heart continued to beat after birth, and in which the delivery occurred between the twenty-sixth week of pregnancy and term. This definition would greatly reduce the

stillbirth rate, but why leave out the fetus born dead before the twenty-sixth week?

Figures available from the U. S. Public Health Service in 1928 give 89,765 stillbirths reported in the birth registration area. Since this area includes only about 94.9 per cent of the country, and since it is a well-known fact that all stillbirths are not reported, it is safe to assume that at least 100,000 children in the United States were stillborn in that year. This is a tremendous loss and makes us wonder why, with the great advances in other fields of medicine, we have not been able to reduce this fetal mortality rate.

Complications of labor, toxemias of pregnancy and syphilis are cited as the most common causes of stillbirths.

It is not the purpose of this paper to give in detail the causes of stillbirths, but to call your attention to a few factors which, for self-evident reasons, would not be published in the vital statistics: haste, "convenience," operative deliveries, and our changed social and economic condition. The use of numerous analgesic and oxytocic agents for a painless and short labor has been widely advertised both in the lay and medical literature, and as a direct result led to an indiscriminate use of drugs and forceps by many obstetricians.

A statistical study of births in Iowa by Drs. Plass and Alvis is illustrative of this. They have completed a study of 129,539 births with special reference to the method of delivery and the stillbirth rate. According to their findings, the stillbirth rate is arranged in a descending order as follows: (1) Urban hospitals; (2) rural homes; (3) urban homes; (4) rural hospitals.

The operative delivery among 89,270 live births was 11.2 per cent, while among stillbirths it was

*From the Mankato Clinic, Mankato, Minnesota. Read before the meeting of the Southern Minnesota Medical Association, Austin, Minnesota, August 26, 1935.

35.1 per cent. This relatively high operative incidence for the entire group would indicate that many "convenience" operations were performed. In this report premature children account for 43.9 per cent, while the stillbirth rate among full-term babies increases in proportion to the operative incidence, and on this account it is highest in the urban hospitals where operative intervention is more often resorted to. We must bear in mind, of course, that urban hospitals admit more abnormal cases and keep more accurate records.

Dr. Porter of Albany, N. Y., has written an article on "The Prevalent Hour of Stillbirths," and he found that most of the stillbirths occurred during the day, the maximum falling between the hours of 3:00-6:00 P. M., and the minimum between 6:00-9:00 A. M. Dr. Frederick Rice of New York in commenting on this says: "In regard to the causes of the high stillbirth rate during the afternoon, there are a large number of cases which are delivered after a long labor, as labor usually begins during the previous night or early morning. Also at this time of day the physicians are anxious to terminate the case, owing to the demands of other work." The last sentence is very significant, and how many can honestly plead "not guilty"? Many fetal deaths are admittedly due to causes beyond our control, but I believe a large number of babies could be saved if better judgment and less haste were used by the accoucheur. Take as an example, breech delivery and version with breech extraction wherein a higher incidence of fetal mortality is registered than in any other type of delivery. In this emergency it is so easy to become panicky and try to hurry the delivery with the result that the arms become extended above and back of the head, a very unfortunate condition. Then, to free the arms and shoulders, a violent twisting and angulation of the body, while the head is still fixed in the pelvis, will most certainly cause a serious injury to the vertebrae and spinal cord. In delivering the after-coming head, a too vigorous pressure on the fundus is the direct cause of many fatalities. A deep ether anesthesia and less haste will save the lives of many babies. Forceps extraction becomes necessary in from 3 to 5

per cent of all labors, and even under strict indications, and in the hands of skilled operators, there is definite risk to both mother and child. In too many cases forceps are applied because the doctor wants to get away and not on account of any obstetric necessity. I confess the temptation is great, but a little morphine or nembutal for the parturient, and a nap for the doctor, is often a safer procedure.

The great changes in our social and economic life in the last decade, no doubt, have had an indirect influence in keeping up the large stillbirth rate. We have read much of late about the abundant life, social security and curtailment of production, so why expect women to be willing to raise large families? Many years ago Dr. Condit at a Southern Minnesota meeting stated that abortions and miscarriages had increased 60 per cent since the advent of the automobile—and the speed of the automobile is increasing every year. The birth rate in the U. S. is steadily dropping, and in Minnesota alone there is a decline of approximately 25 per cent in the last fifteen years. If we are not to find ourselves in the same category with France, something must be done, and the first step would be a lessening of the number of stillbirths.

The practice of obstetrics brings less financial returns and requires more time and patience than any other field of medicine. Is it any wonder that very few young doctors want to give any special study to obstetrics when surgery will bring wealth and fame with much less loss of sleep? But if we are going to reduce this stillbirth rate, we must have better obstetrics. Dr. Clifford Lull of Philadelphia, in an analysis of 1,000 obstetrical cases, makes this statement: "May I say that I am irrevocably in favor of teaching undergraduate students the most conservative type of obstetrics, call it as you will, masterful inactivity, aseptic watchful waiting, or the Garden of Eden method?"

References

- American Journal of Obstetrics and Gynecology, January, 1932;
January, 1934; August, 1934.
DeLee: Practice of Obstetrics.
Obstetrics-Gynecology, Practical Medicine Series, 1933.
Report No. 1445 from the Public Health Reports.

RENAL AND URETERAL LITHIASIS*

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ALTHOUGH knowledge of the fundamental cause or causes of renal calculi remains almost as obscure today as it did twenty years ago, the diagnosis and treatment of stones in the kidney and ureter have reached a high plane of efficiency. The presence of calculi can be detected by a plain roentgenogram in 97 to 98 per cent of cases, and the accurate localization of stones can be accomplished frequently by intravenous urography alone, although in a certain number of cases cystoscopy is necessary. Stones may now be removed from the urinary tract with a very low mortality and a good end-result in almost all cases. The etiology, diagnosis, treatment, and factors of importance in the prevention of recurrence of renal calculi will be briefly considered.

Etiology

The basic etiologic factors responsible for the formation of renal calculi remain unknown although many theories regarding the development of stones have been advanced. It seems probable that there is no single causative agent active in all cases, as there is considerable variation in the abnormalities found in the study of individual patients. This does not mean that the actual chemical mechanism whereby stones are precipitated is not uniformly active in all cases. Theoretically, it seems possible that when the so-called protective urinary colloids are no longer able, for one reason or another, to maintain the urinary crystalloid material in solution, precipitation of certain urinary salts occurs and stones are formed. It may be that this explanation is entirely false, however, as the electrolytic imbalance which results in the precipitation of calculi might be entirely independent of any colloidal action. The various factors which seriously disturb the normal ionic balance are then responsible for the development of stone. This reduces the formation of urinary calculi to a physiochemical process which apparently may be initiated by a variety of abnormal conditions.

Clinically, obstruction and infection frequently are found associated with stones. In the past, infection was measured largely by the amount of pus in the urine without particular heed being given to the type of organism present. We now know that certain bacteria, such as *Proteus ammoniae*, staphylococci, and certain streptococci which split urea into ammonia and carbon dioxide, thereby creating an alkaline urine, are the organisms most commonly associated with the presence of stones. It is also these bacteria, particularly *Proteus ammoniae*, which are usually present in cases of recurrent calculi. This emphasizes the importance of the hydrogen ion concentration of the urine. In these cases it appears that the urinary colloids are less able to maintain the crystalloids in solution when the urine is decidedly alkaline. In support of this theory it is well known that many people for years have a chronic pyelonephritis of bacillary origin without the precipitation of calculi. In the treatment of patients with stones in the urinary tract associated with infection it is important to culture the urine in order to determine the exact nature of the bacteria present.

That infection does not account for all calculi is well shown by the fact that some stones develop in the presence of a sterile urine, and cultures of the stones themselves reveal no bacteria. Here, some other cause than infection must be responsible for the chemical disturbance in the urine which results in the precipitation of crystalline material. It has been demonstrated in recent years that endocrine and metabolic disorders may be related to the formation of calculi. Experimentally, renal calculi frequently develop in animals on a diet deficient in Vitamin C and Vitamin A. There is usually some associated infection in the urinary tract. Nephrolithiasis is not infrequently found in patients with hyperparathyroidism, presumably because of the disturbance of calcium metabolism which is known to occur in this disease, resulting in an excessive excretion of calcium in the urine. Possibly in this instance the urine becomes super-saturated with electrolytes. It has been fairly well demon-

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strated that cystine stones are formed as a result of a metabolic error in the catabolism of protein, whereby cystinuria develops and cystine crystals subsequently appear in the urine, are precipitated, and stone results. Knowledge of the etiology of stones is important in so far as it enables us to prevent the original formation or recurrence of calculi. Accordingly, an effort should be made to eliminate any of these factors which seems to be of significance in a given case.

Diagnosis

One of the most important single factors leading to a diagnosis of renal or ureteral calculus is an accurately taken history which creates suspicion of the urinary tract in the mind of the examining physician. Typical renal or ureteral colic at once suggests the presence of stone, and this diagnosis can then be readily verified or disproved by current methods of urologic investigation. Unfortunately, all stones do not give such typical symptoms, and the true diagnosis may then be confused with cholelithiasis, cholecystitis, appendicitis, colonic lesions, pelvic disorders, intercostal neuralgia, and other conditions. If one keeps the urinary tract in mind in the differential diagnosis, particularly in cases of right-sided abdominal pain, and has a plain roentgenogram made, most of these diagnostic errors would be avoided. Probably the most common erroneous diagnosis in a case of ureteral stone is appendicitis, and in a case of renal stone, cholecystitis. In an exceptional case a definitely diseased gallbladder or appendix may be present in association with stones in the urinary tract.

In the differential diagnosis of ureteral stone and appendicitis, the history, physical findings, and laboratory studies are of importance. In the former the pain is usually sudden in onset, severe, constant, and less colicky while it is present, though it may come in definite attacks, with periods of ease between bouts of pain. The pain may be located in the renal area, referred along the ureter to the bladder, or be localized in the right lower abdominal quadrant, especially when a marked ureteritis or periureteritis is present. Morphine is often necessary to relieve the pain. Nausea, vomiting, constipation, or diarrhea are uncommon. In appendicitis the generalized colicky abdominal pain, which localizes in the lower right quadrant and is associated usually with

nausea and vomiting, is well known. Although tenderness in the right lower abdominal quadrant may be present in both conditions, it is usually more marked in appendicitis. Rigidity is common in appendicitis but uncommon in ureteral stone. Urinalysis almost uniformly reveals erythrocytes and leukocytes if stone is present, whereas this is not true in cases of appendicitis. Acute appendicitis, when the appendix lies in contact with the ureter or causes periureteritis by extension of the inflammatory process, may occasionally cause a few erythrocytes to be present in the urine. This happens infrequently and hematuria associated with abdominal pain should always demand exclusion of the urinary tract. If from the history, physical findings, and laboratory data one feels that a ureteral stone might be present, a plain roentgenogram of the abdomen should be made, without preparation. Usually this will reveal a shadow if a calculus is present, and an intravenous urogram often localizes the shadow accurately and, in addition, supplies information regarding the relative and absolute functional capacity of each kidney and the amount of obstruction that is present. One should remember that an obstructing stone may cause complete failure of visualization of the kidney, although normal excretion of the opaque medium may occur following relief of the obstruction.

The differential diagnosis of nephrolithiasis and cholelithiasis is not usually difficult, although renal calculi occasionally cause predominately digestive symptoms and stones occasionally are present in both the gallbladder and kidney at the same time. Any patient who fails to obtain relief of pain following cholecystectomy should have the right kidney investigated.

Treatment

The surgical removal of stones from the kidney can be accomplished with satisfactory results in a very high percentage of cases if certain general principles are followed. Pelviolithotomy has entirely supplanted nephrolithotomy as the operation of choice except in cases of very large or branched calculi. The majority of stones can be readily removed through an incision in the pelvis, with no damage to the calices or renal parenchyma. If large, branched stones are present, it may be necessary to perform com-

bined pelvioneolithotomy in order to remove all the stony fragments without causing too great trauma to the kidney by forcibly extracting through the pelvis a large, irregular calculus

jury permanent nephrostomy may be employed.

If the kidney has been rendered practically functionless because of long-standing obstruction or excessive infection, and the opposite kidney is

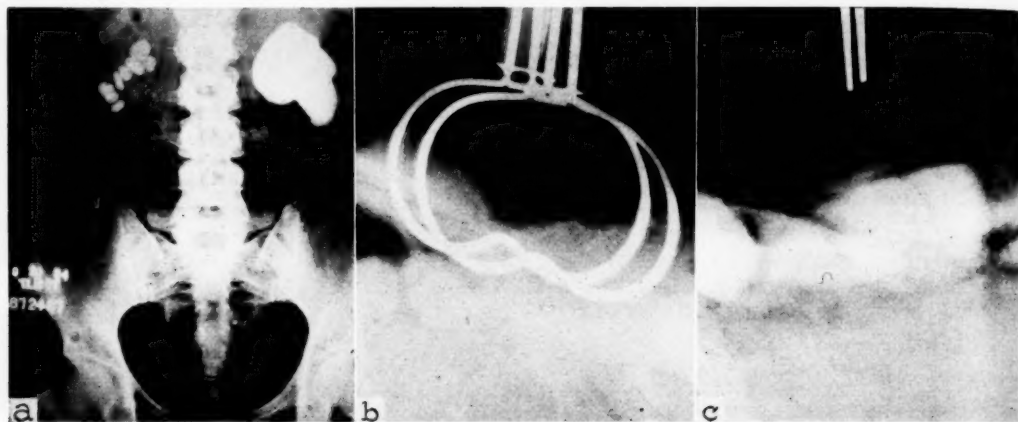


Fig. 1. The patient was a woman aged forty-two years who had bilateral nephrolithiasis. Pelviolithotomy, nephrostomy and a plastic operation on the left kidney, as well as right pelviolithotomy were performed. *a*, Preoperative roentgenogram showing bilateral renal calculi; *b*, roentgenogram of left kidney taken at time of operation and showing no further shadows; *c*, roentgenogram of right kidney taken at operation and showing no further shadows.

which extends into several or more calices. The use of fluoroscopy and roentgenography at the time of operation is of distinct help in making certain that all stones and fragments are completely removed.

For some years there has been a trend toward conservatism in renal surgery. As a result many kidneys are now saved which formerly were removed. I think that the use of nephrostomy, as advocated by Cabot and others, has been of considerable value in saving kidneys which previously would have been considered irreparably damaged. Although in some foreign clinics nephrostomy is performed each time a stone is removed from the kidney regardless of how much infection or renal damage exists, it has been our experience that the greatest field of usefulness of this operation is in cases in which there is marked infection and extensive renal damage. A number 16 to 22 F. soft rubber catheter inserted through the lower calix into the renal pelvis provides excellent drainage for the kidney and permits convenient pelvic lavage with various antiseptic solutions. The amount of restoration of renal function that follows elimination of infection and relief of obstruction is often remarkable. In certain cases of very serious renal in-

jury permanent nephrostomy may be employed. If the kidney has been rendered practically functionless because of long-standing obstruction or excessive infection, and the opposite kidney is

free of disease, nephrectomy is usually the operation of choice. Particularly is this true if the patient is middle-aged or older. If a very small stone is present, which could obviously pass down the ureter spontaneously, operation is not indicated, but the patient should be kept under observation to determine if the stone passes or whether it remains and grows larger, in which event surgical removal would be indicated. There has been considerable discussion about the advisability of removing large, branched calculi, which for years are often almost symptomless until renal insufficiency supervenes. As a general rule it seems advisable to remove these stones unless other disease is present which definitely contraindicates operation (Figs. 1 and 2). If calculi of this type are not removed, renal injury is progressive.

Stones in the ureter, depending on their size, location, amount of infection associated, and condition of the ureter and kidney, may be: (1) allowed to pass into the bladder spontaneously, (2) removed by transurethral manipulation, or (3) removed by ureterolithotomy. Stones too large to pass spontaneously which are located above the brim of the bony pelvis and stones impacted in the lower portion of the ure-

ter should be removed by ureterolithotomy. Ureteral calculi located below the brim of the pelvis, if they are not too large, may usually be removed by transurethral manipulation. It is dif-

doctor, repeated manipulation with catheters and consequent dilatation of the ureterovesical orifice and lower part of the ureter will often be successful over a period of time in securing pas-

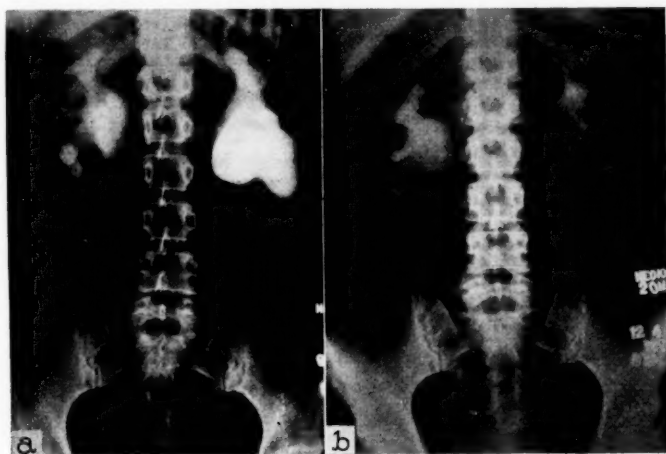


Fig. 2. Same patient as represented in Figure 1. *a*, Preoperative intravenous urogram showing bilateral hydronephrosis and caliectasis; *b*, postoperative intravenous urogram showing reduction in size of renal pelves and calyces.

ficult to set an exact limit on the size of a stone that can be removed transurethally, as this will vary considerably depending on the size of the ureter, the position of the calculus, and on the amount of infection present. The manipulation of ureteral calculi is a highly technical procedure and in my opinion is usually far more difficult than ureterolithotomy. If successful and properly performed, however, this procedure saves the patient from undergoing a major operation.

There have been many instruments devised for the manipulation of ureteral stones. Aside from the use of multiple, twisted ureteral catheters, we have had most success with the Council stone-extractor. This is a spherical-shaped basket, formed by wires, which opens to engage the stone and then closes when the stone is extracted. There must be sufficient room in the ureter to pass the instrument alongside of the calculus. Occasionally this necessitates ureteral dilatation with multiple catheters for forty-eight hours prior to use of the Council extractor. All procedures of this type cause a certain amount of ureteritis, and one must exercise due care in order to avoid excessive trauma to the ureter. If the patient lives in the same community as the

sage of the calculus. It is always important not to permit an acute ureteral obstruction to occur, as renal function is then seriously jeopardized if prompt relief is not obtained.

Prevention of Recurrence

If the most satisfactory results are to be secured in the treatment of renal and ureteral calculi, attention should be given to certain factors that might be responsible for recurrence of stones. It is most important that all fragments be completely removed at the time of operation. Any condition causing obstruction to the kidney should be entirely eliminated. Postoperatively, the urinary tract should be rendered sterile if infection has existed. Depending on the type of organism present and associated conditions, this may be accomplished most efficiently by the oral administration of drugs, intravenous injection of nearsphenamine, lavage of the renal pelvis, the ketogenic diet, or a combination of these various forms of treatment. Should any endocrine or metabolic disturbance be noted, it should be corrected prior to dismissal of the patient. Periodic examinations are desirable, especially in cases exhibiting a marked tendency toward recurrence.

TRENDS IN MEDICINE*

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MY first duty is to thank you for the honor you conferred on me when you elected me President of the Southern Minnesota Medical Association. To be chosen to preside over this society which has among its members some of the most distinguished physicians in the world, naturally causes mingled feeling both of humility and pride. No one but an egotist could believe himself worthy and no one can fail to be proud of the honor. Little did I dream when I joined this Association fifteen years ago, when I first came to Minnesota, that it would ever be my good fortune to be its President.

It is a rather happy coincidence that this meeting comes on my birthday. I trust I am old enough not to accept every new theory advanced but still young enough to look with enthusiasm on the things which are helpful and beneficial to the wholesome progress of medicine. It is unfortunate when one is no longer interested in progress for then he is not an asset to his profession.

Medicine has made great forward strides in the last fifty years. It has advanced from a state of uncertainty to one of scientific accuracy. The specific organisms which cause many diseases have been discovered. With these discoveries a new field in medicine has been opened up—that of prevention.

Preventive medicine has advanced further and accomplished more in this country than any other. Unfortunately some members of our profession have not followed this trend in medicine and have entirely failed to grasp its importance to the extent that they confine their thinking and practice solely to one aspect of medicine, namely, to the treatment of disease. These physicians are as much out of place in the present day progress as an ox-cart would be on a congested highway. They should remember that the physician exists for the patient and not the patient for the physician. It is as much their duty to put forth their efforts in the prevention

of disease as it is to treat it after it has once developed. Surgery also has made wonderful strides so that today operations thought impossible a few years ago can be done with comparative ease and wonderful results.

Steps have been taken to improve the quality of physicians by bringing the medical schools of the country to a higher standard where the student would receive the proper training before being permitted to practice. This has brought about the elimination of the weaker medical schools so that today there are fewer than half as many medical schools in this country as there were at the beginning of the present century. The diploma mills have been eliminated and only schools exist which can give the proper training to fit one to administer to the medical needs of his fellow man. The medical graduate of today has many advantages over one who graduated twenty-five or more years ago. This is not to be construed that the older physician is not qualified to practice. He is, for with his practical experience and study, he has not only kept up but has advanced and it is he who saw the need and worked so diligently to bring about the educational progress that has been made. This advancement has been brought about almost entirely by the physician. Forgetting his personal interests he has striven continually to advance the scientific side of medicine and endeavored to give to the public the best medical service possible.

At the present time we are experiencing radical changes along many lines; some may be for the better, others, no doubt, for the worse. There seems to be a feeling on the part of some that everything is wrong and should be changed. Most of these enthusiasts are long on theory and short on experience and common sense. It seems to me there is nothing in the past to show that revolutionary changes have proven beneficial but on the contrary have caused much suffering and unhappiness and have been only temporary. Changes that have proven stable and lasting have come slowly and progressed gradually whether made in business, government or

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medicine. They have come through the process of development in which the good has been sifted out and preserved rather than through the process of tearing down and building new. The medical profession made up of humans naturally is not perfect but it has done a most excellent job in the past and is constantly improving. Steady progress as has been made in recent years will bring better results than radical changes with the risk of destroying that which is good. Today the American citizen is receiving better medical care under the best trained physicians than has ever previously been the privilege of anyone in any country.

State Medicine

State medicine has been advocated by some, feeling that it would be an improvement over our present system. A careful study of the progress made in medicine and what has been accomplished shows the folly of thinking state medicine could have brought as good results. I wish to state that while I am a state physician I am opposed to the idea that state medicine should supplant our present system. It is doubtful if either the public or physician could benefit by it. It would destroy competition and individual effort—the very things that have made medicine what it is today. The physicians of southern Minnesota are what they are because they had real competition in the form of the greatest medical institution in the world right in their midst. It has been a great help to those practicing in southern Minnesota and has been the means of making them the most progressive as well as best trained practicing physicians in any part of the world. It is doubtful if any such institution as this would be in existence if it had to depend on the state or federal government to make it such. It was founded and developed largely through individual effort by men with vision, training, determination, foresight and willingness to work.

Let us look at the medical schools of the country. What made the greatest of them the schools they are? It was largely the effort of outstanding men, leaders in their profession. If five or six of the best medical schools of our country were to be selected today it is doubtful if a single one of the State Medical schools would fall in this group. This does not mean

there are not excellent medical schools in some of our state universities; they are all better than the best medical schools were a few years ago. It is well that we have had the independent medical school for it has been a great factor in making the state schools what they are at present.

There is nothing to show that state medicine would serve the public better, but much to the contrary. This does not mean that the state should not concern itself with medical matters or enter into certain phases of it. There are fields in which the state can enter with benefit to all concerned. The State Board of Health (state medicine, if you wish to label it such) has done much and is necessary in the control of preventable diseases. It should have the united support of the medical profession. The state in taking care of the mentally unfit is rendering a service that could not be otherwise obtained. The same is true of tuberculosis. There are very few patients who could provide their own treatment without state aid. To permit them to go uncared for would not only deny them the chance to recover but would also submit those with whom they associate to the danger of the disease. Although the state is taking care of many patients afflicted with tuberculosis, and the annual death rate from tuberculosis is one-third of what it was in 1910, the average physician is doing more tuberculosis work today than ever before. It may be true that it is largely preventive but this is when it brings the best results. The proper coöperation between the physician and the state in those fields where it is necessary for the state to enter will do much to prevent state medicine. An understanding public does not care for state medicine for it is contrary to the ideals of the average American citizen. It would seem therefore that with the proper coöperation of the practicing physician in the control of preventable diseases it will never be a reality. This is not an inference that the private physician should leave the state to take care of the preventable diseases but he should give the state the proper assistance in their control. This will bring the desired results and the physician will retain his patient. He can help the state do what it can not do alone and the state can aid him in doing what is best for the patient and the public.

State Public Health Association

We are fortunate in having in this state a Public Health Association directed by physicians and allied closely with the State Medical Association, a relationship proving helpful to both organizations. It has been doing a wonderful piece of work especially in the fight against tuberculosis. The results obtained have been brought about largely through the interest and support of the medical profession. Its work is statewide, and in order to get the best results it is necessary to have the backing of every physician as well as the united support of all the counties. Unfortunately two or three counties under the direction of some well meaning but poorly advised people felt they could accomplish more and do better work if they pulled away from the state organization and directed their own destinies. Naturally the expected results did not materialize for statewide organization in a program of this character is essential. None of these counties show as low a death rate from tuberculosis as those immediately surrounding them. It must be somewhat embarrassing to the physicians practising in these counties to have such a condition exist knowing that it is to a certain extent a reflection on them even though they were in no way responsible for it. The physicians of these counties could do a worthwhile piece of public health work if they would take a greater interest in their county organization, encouraging it to unite with the state organization, for with an united front only can the best results be obtained. Every effort possible should be made to bring these counties into the State organization so that greater good can be accomplished. There is no state in the union having a better Public Health Association than the State of Minnesota. It is largely because it is so closely related to the State Medical Association that it has been able to accomplish what it has. To continue the pleasant relationship of the past will help the medical profession and the association to render a greater service to the public and also serve to prevent state medicine. Such organizations need medical direction so that wasted effort may be avoided. The Public Health Association should not only have the endorsement of every practising physician but also his wholehearted support.

The Public Health Nurse

The Public Health Nurse has come with changing conditions and progress. Maybe every nurse is not an ideal one; neither is every physician. There are some physicians who condemn, without reason, the public health nurse as being an unnecessary evil. They seem to forget that she may be the daughter or sister of a physician. Hers is a profession that is honorable and necessary and can be a great help to the physician. His coöperation and interest should be mutually helpful in rendering a greater service to humanity.

Tuberculosis

It would hardly be fitting for me to close this paper without touching on tuberculosis, since the greater part of my professional life has been spent in this work.

The state of Minnesota holds an enviable position in the campaign against tuberculosis. It is well provided with institutions for the care of those suffering from this disease. The physicians of the state for the most part have co-operated in its prevention and treatment. The result is that the death rate has fallen from 110 per hundred thousand in 1910 to thirty-five per hundred thousand in 1934. This wonderful result could not have been accomplished had it not been that the physicians and state had co-operated in the fight. I am sure the average physician is doing more real tuberculosis work at the present time than he was doing in 1910 before any institutions for the care of the disease were built, and it is of a nature that brings better results.

As an example of the coöperation on the part of the physicians I would like to mention a piece of work done in one of the counties of the Southwestern Minnesota Sanatorium district. The physicians in Lincoln County decided they wanted the pupils of the schools of that county tested for tuberculosis and made application to the sanatorium for same. It looked like a big undertaking, especially to attempt to test the pupils from the rural schools. They felt that this could be satisfactorily accomplished by having the pupils from the rural schools come into the towns at the same time the tests were being given there. Through their wholehearted co-

operation, 85 per cent of the pupils of the rural schools and 95 per cent of those in town schools received the test. I believe this is one of the most completely tested counties in the country, and at the same time it had one of the lowest percentages of reactors of any on record, 3.2 per cent of the children of the largest town and only 2.8 per cent of the children in the county seat, the average for the county being only 4.3 per cent. This low percentage of reactors was due largely to the work that had been done by the physicians of that county in finding cases early and having them enter the sanatorium or be properly cared for before they had become a danger to their associates. Every child who reacted was x-rayed. These physicians are rendering a real service to humanity. It is a service of prevention rather than one of unsatisfactorily treating a disease when it had become clinically active. As long as they render a service like

this to their community there is a very little danger of state medicine becoming a reality. It is the physician who fights every movement as state medicine, regardless of its merit, and allows his patient to die and others to become infected with preventable disease who will bring state medicine. The public wants and will demand protection, and if the private physician cannot give it, the public will seek something different. There is no reason why the state cannot help the physician take care of a patient who cannot get the proper care otherwise. The proper cooperation between the state and physician will give better results than can otherwise be obtained and the best should be the goal desired by all. Every effort possible should be made to give the people the best medical service both in prevention and treatment, for by so doing the public and the physician will both be benefited.

THE SYMPTOMATOLOGY OF EPIGASTRIC HERNIA

Analysis of 296 Cases

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and

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THE presence of an epigastric hernia in a case in which the patient complains of epigastric pain and indigestion leads the physician, in the absence of obvious pathologic change within the abdomen, to speculate as to the possible relationship of the lesion of the abdominal wall to the symptoms. The symptoms attributed to epigastric hernia have been said by Moschowitz to be so constant as to be practically diagnostic,^{6,7} and "to consist of eructations, nausea, and periodic attacks of pain localized into the entire epigastrium." Other observers find that the symptoms may resemble those of peptic ulcer, cholelithiasis, gastritis, cancer, and pyloric obstruction,^{3,9} and the frequent coexistence of such

symptoms and visceral disease has often been observed.^{4,5,8,10}

In the absence of demonstrable visceral disease, symptoms usually regarded as visceral in origin have been explained as due to inclusion of a part of the hepatic ligament in the preperitoneal fat comprising the hernia, with irritation of the parasympathetic nerve fibers and reflex stimulation of the solar plexus.^{2,8} If, as infrequently occurs, the fascial defect becomes so enlarged that a peritoneal sac develops, the lesion is subject to the same symptoms and complications as hernias elsewhere.¹

In order to determine the relationship of epigastric hernias to visceral symptoms, an analysis was made of all cases of epigastric hernia repaired at The Mayo Clinic from 1910 to 1933, inclusive, with correlation of the preoperative

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symptoms, the surgical findings, and the late postoperative results.

The cases divided themselves into two major groups, 138 patients being hospitalized for the surgical treatment of some associated condition, with secondary repair of the epigastric hernia, and 158 being hospitalized for symptoms which it was hoped that repair of the epigastric hernia would alleviate.

In the first group of 138 patients with known associated visceral diseases, the symptoms were primarily those of the visceral lesion, and the results in the 131 cases in which the further course was known are given in Table 1.

TABLE 1. RESULTS IN 138 CASES IN WHICH EPIGASTRIC HERNIAS WERE REPAIRED IN THE COURSE OF OPERATIONS PERFORMED PRIMARILY FOR OTHER CONDITIONS

Operations	Patients	Per cent relieved by combined procedures
Appendix	29	52
Gallbladder:	32	
Stones present		80
Stones absent		58
Stomach, duodenum, and small intestine:	56	
Benign lesion		88
Gastric carcinoma	13*	15†
Miscellaneous‡	14	100
Total	131§	

*Eight of these patients had inoperable carcinomas.

†Of the five patients operated on, three are dead and two are living, one sixteen years and the other eight years after operation.

‡The epigastric lesions associated with the conditions for which these miscellaneous operations were performed were asymptomatic.

§The further course in seven cases was not known.

The 158 patients in the second group who were hospitalized for repair of epigastric hernia were divided into three sub-groups, twenty-six undergoing abdominal exploration at the time the epigastric hernia was repaired, thirty-seven having the epigastric hernia repaired at the same time a coexisting inguinal, femoral, or umbilical hernia was repaired, and ninety-five having the epigastric hernia alone repaired, without abdominal exploration.

Of the twenty-six cases in which abdominal exploration was associated with repair of the epigastric hernia, the abdominal exploration was

negative in eleven cases; in fifteen cases an associated visceral disease was treated surgically at the same time the hernia was repaired. Of the eleven cases in which abdominal exploration was negative, the symptoms in seven cases were only of local pain on exertion; in the remaining four cases visceral symptoms were present. These visceral symptoms varied from hunger pains, which were localized in the epigastrium and were relieved by food and alkali in one case, to diffuse abdominal cramps, bearing no relation to meals or exertion, in another. In no two cases, however, was there a common visceral symptom. Two of these patients were subsequently relieved of symptoms following repair of the hernia and additional instruction in dietary precautions and elimination; two have not subsequently been heard from. Of the seven who complained only of local pain on exertion, three were relieved by repair of the hernia, one had recurrence of distress associated with recurrence of the hernia, and three have not subsequently reported.

Visceral symptoms were present in all of the fifteen cases in which abdominal exploration was performed at the time the hernia was repaired and in which the visceral disease was treated surgically at the same time. The visceral symptoms varied widely and conformed, in general, to the usual symptoms associated with the coexisting visceral lesion, such as upper abdominal colics in those cases in which there was associated cholelithiasis, hunger pains with relief on taking food in cases of associated duodenal ulcer, and soreness and tenderness in the epigastrium with vomiting in two cases in which there was subacute purulent appendicitis. There was, however, no common or typical set of visceral symptoms in all cases, which should have occurred had the visceral symptoms resulted from the epigastric hernia common to all. The late results in this group of fifteen cases were as follows: One patient with obstruction of the small bowel was well after relief of the obstruction; one patient with duodenal ulcer was well after gastroenterostomy; of five patients with cholecystitis, three were well, one had further trouble, and one was not heard from, after cholecystectomy; one patient with duodenal ulcer was not heard from after his return home following gastro-enterostomy, and of seven patients with appendicitis, one was well, three had further in-

digestion, and three did not report, after appendectomy.

Of the thirty-seven cases in which the epigastric hernia was repaired at the same time an inguinal, femoral, or umbilical hernia was repaired, the further course is known in thirty cases. Before operation, twenty-one of these patients had no visceral symptoms but complained simply of local distress at the site of the epigastric hernia on straining; of these twenty-one, seventeen had no further trouble after repair of the epigastric hernia, four continued to have local distress at the operative site on lifting or straining, one of the four having an associated recurrence of the hernia. Nine of the thirty patients who underwent operations for multiple hernias had visceral symptoms. There was no characteristic visceral symptom common to all nine patients. Three had hunger pains when the stomach was empty, two being relieved postoperatively after the diet had been changed; one continued to have distress. One patient had eructations and mild upper abdominal colics after meals, which continued after the hernias were repaired. Five patients had generalized abdominal pains associated with constipation and flatulence; two were relieved postoperatively on institution of an anticonstipation diet, and three continued to have the same distress.

Of the ninety-five cases in which the epigastric hernia was repaired at the primary operation, abdominal exploration not being performed, the late results are known in seventy-five cases. Visceral symptoms were not present in thirty-three of these seventy-five cases, the patients complaining only of the presence of deformity, which was usually associated with local pain on exertion. Of these thirty-three patients, twenty-six were relieved of all symptoms by repair of the hernia, whereas seven continued to have local pain at the operative site on straining. Three of the seven who continued to have local pain had associated recurrence of the hernia.

Forty-two of these seventy-five patients who underwent repair of the epigastric hernia only had associated visceral symptoms. No group of visceral symptoms was common to all patients in this group. Only eight of these forty-two patients were relieved of the visceral symptoms postoperatively, and of these eight, four had hunger pains relieved by food or alkali, and re-

ceived instructions similar to those for patients treated medically for ulcer, whereas the other four had gas pains associated with constipation and received instruction in an elimination diet, after the operation for epigastric hernia.

Thirty-four of the forty-two patients with visceral symptoms who at the primary operation underwent repair of the epigastric hernia continued to have the same visceral symptoms after operation. Seventeen of these thirty-four patients have had no further surgical procedure, and the nature of their preoperative and postoperative visceral symptoms was as follows: Eight had periodic episodes of gnawing epigastric pain when the stomach was empty, relieved by the ingestion of food or alkali, six had upper abdominal distention and eructations of gas after heavy meals, associated with mild epigastric colics, and three had diffuse gas pains associated with constipation and flatulence.

Seventeen of the thirty-four patients whose visceral symptoms were not relieved by repair of the epigastric hernia required secondary surgical procedures. Ten had fullness in the upper part of the abdomen associated with eructations and upper abdominal colics of varying severity, and were found at the secondary operation to have cholecystitis, in nine cases with stones. Following cholecystectomy, six patients were relieved, three had further indigestion, and one did not report. Two had had epigastric pains when the stomach was empty, but these pains were relieved by ingestion of food or alkali; at the secondary operation both patients were found to have duodenal ulcer. Following gastro-enterostomy, one was relieved and one failed to report. One patient had nausea, epigastric pain and regurgitation which were not relieved by repairing the epigastric hernia; at the secondary operation a palliative gastro-enterostomy was done for inoperable carcinoma of the stomach, the patient living four months after the operation. One patient had had pains in the right loin which were projected to the epigastrium and were accompanied by vomiting; they persisted after repair of the epigastric hernia until they were relieved by a right nephrectomy for pyelonephritis. One patient had nausea, vomiting, and epigastric soreness, which grew progressively worse after the epigastric lesion was repaired until seventeen

months later when localizing signs of cerebellar tumor appeared. On exploration, an inoperable cerebellar tumor was found and the patient died four days later. One patient had epigastric pain with vomiting immediately after meals, which persisted after the epigastric hernia was repaired. Three months later a carcinoma of the pancreas, with metastasis, was found. One patient had recurring pain in the right lower abdominal quadrant with soreness in the epigastrium; this persisted following repair of the epigastric hernia. Following secondary appendectomy, the patient was relieved except for some pulling sensations in the region of the scar.

Summary

In regard to the symptoms, the patients with epigastric hernia who did not have obvious visceral disease divided themselves into three groups: One group had no subjective symptoms, desired surgical interference purely for cosmetic reasons and to confirm the diagnosis, and obtained uniformly good results from repair of the hernia. The second group complained simply of local pain in the abdominal wall at the site of the hernia, on straining. The majority of these patients obtained relief from repair of the defect in the abdominal wall. A few continued to have pain at the operative site on exertion, even though the defect in the abdominal wall remained closed, and a few had recurrence of symptoms associated with recurrence of the hernia.

In the third group, consisting of patients who complained primarily of visceral symptoms, no single symptom was found to be characteristic, either for those who were subsequently relieved of their distress or for those who continued to have further trouble. A number of those who were subsequently relieved of indigestion had complained of periodic episodes of burning epigastric pain, coming on several hours after meals and relieved by ingestion of food or alkali. In all cases roentgenograms of the stomach were negative, and in only one case were the values for free hydrochloric acid in the stomach increased above normal. The remainder of those who had had visceral symptoms before the epigastric hernia was repaired and who were subsequently relieved of these symptoms, had had

diffuse abdominal cramps, associated with constipation, relieved by the passage of a stool or flatus. In both these sub-groups, the patients received appropriate advice concerning the diet and regimen to be followed postoperatively, and it seems quite probable that this was a more important factor in the relief of the visceral symptoms than repair of the epigastric hernia.

The total number of patients relieved of visceral symptoms following repair of epigastric hernia alone, 22 per cent, does not compare favorably with the group in which the patients were relieved when the symptoms consisted simply of local pain on exertion, 72 per cent, or the group in which repair of the epigastric hernia was associated with operation for a coexisting visceral lesion.

Conclusions

In this group of 296 cases, no group of visceral symptoms was found which could be said to be typical of epigastric hernia which was amenable to surgical repair. The frequent co-existence of organic visceral disease recognized at the time the hernia was repaired, or subsequently, emphasizes the importance of opening the abdominal cavity and exploring its visceral contents at the time the hernia is repaired, whether or not preoperative diagnostic procedures have been able to localize organic visceral disease.

Bibliography

1. Delannoy, E.: Hernie épigastrique étranglée. Bull. et mém. Soc. nat. de chir., 59:319-321, (Mar. 4) 1933.
2. Freeman, L.: Concerning the nature of epigastric hernia and its relation to gastric and other disturbances. Nebraska Med. Jour., 17:159-161, (Apr.) 1932.
3. Friedenwald, Julius, and Morrison, T. H.: Epigastric hernia: a consideration of its importance in the diagnosis of gastro-intestinal disease. Jour. Am. Med. Assn., 87:1466-1470, (Oct. 30) 1926.
4. Hunter, Charles: Epigastric hernia (hernia of the linea alba). Internat. Clin., 4:110-112, (Dec.) 1932.
5. Hutter, K.: Beitrag zu den Beziehungen zwischen epigastrischer Hernie und Erkrankungen der Bauchorgane. Zentrabl. f. Chir., 54:854-856, (Apr. 2) 1927.
6. Moschowitz, A. V.: The pathogenesis and treatment of hernie of the linea alba. Surg., Gynec. and Obst., 18:504-507, 1914.
7. Moschowitz, A. V.: Epigastric hernia without palpable swelling. Ann. Surg., 66:300, (Sept.) 1917.
8. Moure, P., and Martin, R.: Le rôle du ligament rond du foie dans les hernies épigastriques et ombilicales douloureuses. Bull. et mém. Soc. nat. de chir., 59:1011-1017, (July 1) 1933.
9. Sullivan, D. F., and Antupit, Louis: Epigastric hernia in its relation to intra-abdominal disease. Ann. Surg., 86:413-416, (Sept.) 1927.
10. Tracy, J. L.: The diagnosis of epigastric hernia: report of a case. Med. Jour. and Rec., 127:264-265, (Mar. 7) 1928.

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BUSINESS MANAGER

J. R. BRUCE, Saint Paul

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Gallbladder Surgery and Dr. Ohage

THE name of Dr. Justus Ohage will ever be associated with the development of gallbladder surgery. The sketch of his life which appears in this issue indicates the bold pioneer spirit which led him to come to this country at the age of fifteen. After receiving his medical degree from the University of Missouri in 1880, he was ambitious for further surgical knowledge and it was his postgraduate work immediately pursued in Germany and England that led to his pioneer gallbladder work soon after locating in Saint Paul in 1881.

In the *Northwestern Lancet* of November 1, 1886, under the report of the Ramsey County Medical Society meeting of September 27, 1886, appears the following:

"Dr. Ohage then showed a very interesting specimen of a gallbladder which he had extirpated four days before. The case was that of a lady diagnosed

empyema of the gallbladder. Only one large vertical incision was made instead of the usual T; about half a pint of watery liquid was found and a large stone impacted in the cystic duct; the stone was worked back into the bladder before it was removed.

"The greatest difficulty was found in separating the natural adhesions to the liver; the bladder was removed without aspiration and the abdominal wound was closed completely. This is the fifth day after operation, the temperature is normal and the patient is doing well. This is the sixth operation performed, five of which recovered."

Our attention was also called to an article by Dr. Ohage entitled, "The Surgical Treatment of Diseases of the Gallbladder," in *The Medical News* for February 19 and 26, 1887. In this article he discusses cholecystotomy and cholecystectomy and reports the number of operations to that date.

To Marion Sims he gives the credit for the first cholecystotomy, in April, 1878, but the patient died from hemorrhage. Kocher, in June, 1878, first performed this operation successfully, the patient recovering in five weeks. To date, Dr. Ohage had found fifty reported cases of cholecystotomy with thirty-nine recoveries.

Cholecystectomy, on the other hand, was first proposed by Langenbuch of Berlin. By 1887, Dr. Ohage found it had been performed nine times. Langenbuch had performed it five times with one death; Thierar twice successfully; Courvoisier once successfully, and Dr. Ohage once successfully, his case being the first reported in the United States. He reports the case in detail and it is interesting to note that no drainage was used.

Dr. Ohage then was the first surgeon to perform a cholecystectomy in the United States. This was carried out September 24, 1886, at St. Joseph's Hospital, Saint Paul, and it is interesting to note that the patient lived forty-three years following operation. This was in the transition stage between antiseptic and aseptic surgery and the statement by Dr. Ohage that "cleanliness is the cardinal rule of antiseptic surgery" is significant. The pioneer gallbladder surgery of this eminent member of our profession is well worth recalling.

Biopsy Condemned

BIOPSY undoubtedly lends itself to more accurate diagnosis although it must be admitted that it is by no means 100 per cent accurate. Does not this attempt at accurate scientific diagnosis often work to the disadvantage of the patient?

The author of an article entitled "Penalties of the Biopsy"* calls attention to the inconsistency of recognizing the danger of metastases from injury to a cancer and then deliberately cutting into a cancer to obtain a biopsy.

A metastasis results from dissemination of cancer cells through blood or lymph circulation and is a matter of seconds rather than hours or days. Cutting into a cancer, be it of the cervix or fundus of the uterus or of the skin or breast, carries with it the possibility of prompt metastasis even though operation follows in a few hours or days.

In the case of a suspicious appearing cervix, the author of the article mentioned admits a feeling of guilt after taking a biopsy even though he immediately cauterizes the site and promptly operates.

The diagnostic curettage is a common procedure and should be heartily condemned. When the clinical history and examination point to a carcinoma of the fundus, a diagnostic curettage only increases the danger of metastasis and the examination of curettings is notoriously unreliable. A curetting never includes the entire uterine cavity and the cancerous tissue may be missed. The histological examination may also miss the cancer in the curettings. Often, too, there is an unnecessary delay between the curetting and the operation which further diminishes the likelihood of cure of cancer, the location of which makes it particularly amenable to complete operative removal.

The reasoning of the author of the article mentioned is perfectly logical and is confirmed by clinical experience. His condemnation of the practice of biopsy examination by cutting into the cancerous growth deserves emphasis.

*Kennedy, J. W.: Penalties of the biopsy. *Med. Record*, 142:560, (Dec. 15) 1935.

Protamine Insulate

NOT infrequently one encounters a diabetic patient in whom the control of glycosuria is impossible even by the administration of four or five injections of insulin in twenty-four hour periods. The blood sugar level regulatory apparatus seems so sensitive that in spite of the several injections the blood sugar at times in the twenty-four hours is abnormally high, resulting in glycosuria, and at other times abnormally low, producing symptoms of hypoglycemic shock.

Repeated attempts have been made to delay the absorption of injected insulin without success. Now comes the announcement that certain Danish investigators* have been able to produce this slower absorption of insulin by the addition of a monoprotonamine derived from the sperm of a salmon. When it was found that the injection of this protamine into a normal human being was harmless, its use in combination with insulin was begun clinically. Its use on eighty-five diabetic patients during the past two years has apparently proved its value. While not replacing insulin in acidosis, where quick action is needed, nor in mild cases easily controlled by small doses once a day, this new mixture is indicated in the more severe cases, sometimes alone but more often in conjunction with insulin. Careful clinical investigation reported by the authors shows a leveling off of blood sugar levels due to the more prolonged effect of this mixture.

The product is not yet commercially available but doubtless will be so before long. The discovery promises to be of great value in the treatment of certain diabetic patients requiring insulin.

Cyanide Antidotes and Medical Progress

Recent successes with methylene blue and sodium nitrite in the treatment of cyanide poisoning are striking. As a result, the treatment of poisoning in general is receiving more attention and undergoing creditable revision. Methylene blue and sodium nitrite are far apart chemically, physically and pharmacologically, so that a common factor in their antagonism of cyanide poisoning would hardly be suspected. Yet that is exactly what has been discovered, and the discovery testifies to the value of the experimental method in medical science. This common denominator is specific and definite. Its utilization should remove all guesswork from the treatment of cases of cyanide poisoning. (*J. A. M. A.*, November 2, 1935, p. 1433).

*Hagedorn, H. C., Jensen, B. Norman, Krarup, N. B., and Wodstrup, I.: Protamine insulate. *Jour. Am. Med. Assn.*, 106:176, (Jan. 8) 1936.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association

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What Can I Do For My County And State Medical Society?

Suggestion Number Five

1. Do not be guilty of advocating or encouraging health insurance or socialized medicine by such careless remarks as these:

"Socialism is bound to come"

"We should be prepared for socialized medicine"

"A large portion of the population has inadequate medical care"

"European countries have found out that state medicine works"

Statements of this kind are sometimes made, even by physicians. These physicians have not investigated the facts.

2. If, by any chance, it is your conviction that any of the above statements are correct, thoroughly investigate the data that are available at American Medical Association headquarters.

Discuss the subject thoroughly with well informed officers of the association. You will then understand why organized medicine is doing everything in its power to insure the continuance of the American system of medical practice; why organized medicine fears and rejects all visionary theories for government control.

fluenced to believe that the present methods of caring for the sick are inadequate and that the establishment of a system of health control under federal and state supervision would offer the best solution.

Unfortunately, there are members of our own profession who have expressed themselves as favorable to health insurance and state medicine.

Difficult to Repair

Most of these colleagues, strange as it may seem, have received their information from every source except that great storehouse of accurate information which has been accumulated in the headquarters of the American Medical Association. They have made little or no effort to get in touch with these sources of information or with the officers of the association who are familiar with them. In the quest for knowledge, various lay societies have appealed to some of these iconoclasts for guidance. The unfortunate impression left by our representatives who criticize the present system of practice and advocate governmental control is difficult to repair.

Selling Their Heritage

To the shame of our profession a group of physicians in the east have organized a society to further socialism of medicine. They have done so without seeking information or counsel from organized medicine. In their ranks are many who, under the urge of economic distress, are willing to sell the heritage of the ages for immediate gain. There is nothing more injurious to American medicine than to have its own members snipe at policies which are supported by an overwhelming majority of the medical profession. While the present system of medicine is not perfect, it is so far superior to any other which has yet been advanced that it would be

Concerning Some "Medical Opinion"

Stimulated by efforts on the part of the federal government to readjust various phases of social inequality, the desirability of state control of all matters pertaining to health is being widely publicized. It has become a favorite subject for debate in colleges and high schools; it is heard over the radio, and is often discussed in gatherings of various kinds. As a result, the public is being in-

folly to adopt any of the proposed methods of reform.

More Fancy than Fact

Many of our colleagues who advocate state medicine have made statements which are based more on fancy than fact. Among these is a widely quoted statement to the effect that a large percentage of the population receives inadequate medical care. In proof of this, reference is made to surveys made by the Committee on the Cost of Medical Care, the United States Public Health Service, and by the Medical Societies of Michigan and of California. It has been repeatedly shown from information held in the files of the American Medical Association that these investigations are most inadequate and that they have reached many conclusions which are erroneous. A statement widely publicized to the effect that 40 per cent of the public do not receive adequate medical care was made recently by one of our colleagues before a public gathering, and is an example of the cloudy and inaccurate statements which are so often bandied about in the course of so-called authoritative talks on this subject. This assertion is a direct reflection upon the members of the medical profession and insinuates that they would deliberately permit anyone who sought medical advice to suffer for want of it.

They do Not Know

Statements also have been made by physicians that the personal relation existing between the patient and the physician and the method of selecting physicians are of minor importance. Such statements usually are made by men who have not engaged in the general practice of medicine and who do not appreciate the full value of the personal relationship which is essential to the best medical care. Unfortunately, their remarks are accepted as indicative of the opinion of a considerable proportion of our profession.

Members of our profession have cited the experience of European countries with state medicine as examples of the benefits of such reforms. They do this in spite of the fact that it has been shown repeatedly that governmental control and compulsory health insurance are accompanied by continually increasing costs and by complications which are uncontrollable and which are injurious to the care of the sick.

Leading to Commercialism

There are advocates among physicians for medical care on a voluntary prepayment basis. This is done in spite of the fact that experience has shown that sooner or later such schemes lead to commercialism and to competitive bidding. This reduces the fees to a level which makes it impossible to supply adequate medical care. If you doubt this, write to Dr. Leland of the Bureau of Medical Economics and let him supply you voluminous evidence to prove it.

Far from True

Casual remarks such as "State control of medicine is bound to come," may give the impression that such convictions are commonly held by physicians. Such evidence of defeatism does no one any good and, judging from recent developments, it is far from true. The majority of the medical profession firmly believe that the common sense of the American public is too great to allow tinkering and experimentation with their health such as is advanced by these socialistic theorists. There is every indication today that the American people are waking up to the dangers of the socialistic experimentation. A decided reaction has set in against many of the proposed innovations. It would be a sad day for American medicine and for the state of the general health if public opinion could be led astray by socialistic propaganda.

Ready to Debate

The regional high school debates will soon be under way in all parts of Minnesota.

Subject: Resolved that the several states should enact legislation providing for a system of complete medical service available to all citizens at public expense.

Presumably, physicians have been in touch with debate coaches and teams in every community where high schools have entered teams.

They have made occasions to meet and talk things over with the debaters.

They have made a point of seeing that the debaters and their coaches were supplied with all the material that is available at state headquarters, 11 West Summit Avenue, Saint Paul.

They have made arrangements to be present at any of the debates held in their own commu-

nities and, if possible, have asked for a little time to sum the question up at the time of the debates.

One Member Did It

One member from a Northwest town did that and more. Then he sat down and wrote an outline of his work for the information of and assistance of others who might wish to do likewise.

Against the possibility that, here and there, busy medical men have neglected this extremely important obligation, his interesting résumé is printed herewith. There is still time for physicians in other localities to see that debaters are properly supplied with material on the negative side of these debates.

Says this member:

"I first contacted the coach of the debaters, giving him all the materials which I had, medical magazines, American Medical Association Material and various articles from our own MINNESOTA MEDICINE and write-ups which I had taken from other articles in other magazines relative to the question. I also had a good talk for about an hour and a half with the coach in my office one evening when both of us had plenty of time to talk the matter over. A book containing some reports of the Committee on Costs of Medical Care was loaned to him for his use.

"I then contacted the coach of the extemporaneous speakers in our high school and also the teacher who has charge of the business course in our school.

Talked to Students, Teachers

"I gave the talk as outlined in the speech sent by you, before the members of the debating team and the extemporaneous speakers and also to the girls in the stenographers' class, together with the three teachers. I elaborated here and there with some of my own experiences and various statistics and figures which I had obtained elsewhere. With the aid of the stenographers we then placed copies of the talk in the hands of all the speakers. Following that I put the bulletin from the American Medical Association in which appeared the radio debate which presented both sides of the question into their hands to be copied and distributed to the debating teams.†

To Answer Last Minute Questions

"I have arranged it so that, at the time when the speakers are about ready to appear in the debates, I, and perhaps one or two other doctors here in the city, can hear them and comment on the points made as the talks are given. This will be a sort of dress rehearsal and it will give us a chance to answer any question which may have arisen in the minds of either affirmative or negative debaters.

"I believe it has thus been possible for me to impress upon the students of our high school that there is really only one side to this question: that we are not, however, fanatics on the subject but willing to learn anything which may be of use to us from the affirmative arguments.

"I have the coaches on our side and know that no impression will be made in this community that is detrimental to the medical profession."

Two to Six!

Final returns showed *two victories* for the negative and *six victories* for the affirmative in the Western Conference of College Debating Teams.

Inter-collegiate debates were completed in December. High School debaters heeded them well and will model their strategy on both sides upon collegiate models.

They need and will welcome authoritative assistance in preparations for the defense of the negative side.

Members of the Minnesota State Medical Association have a special responsibility and obligation to help them.

"Their Own Worst Enemies!"

—Dr. Holmes

EDITOR'S NOTE: This is the second of a series of communications by Dr. B. J. Branton of Willmar, chairman of the Medical Legal Advisory Committee, on problems associated with malpractice litigation.

Dr. Oliver Wendell Holmes was not only a pleasing poet, a learned physician, but a scholar of unusual perception. In his valedictory address to the graduating class of the Bellevue Hospital College over a half century ago he said, among other things:

"Your relations to your professional brethren may be a source of life-long happiness and growth in knowledge and character, or they may make you wretched and end by leaving you isolated from those who should be your friends and counsellors. The life of a physician becomes ignoble when he suffers himself to feed on petty jealousies and sours his temper in perpetual quarrels. You will be liable to meet an uncomfortable man here and there in the profession,—one who is so fond of being in hot water that it is a wonder all the albumen in his body is not coagulated. There are common barrators among doctors as there are among lawyers,—stirrers up of strife under one pretext or

†Reprints of this debate by Dr. Morris Fishbein, Dr. R. G. Leland for the negative and William Trufont Foster and Bower Aly for the affirmative are now available at the State Office.

another, but in reality because they like it. They are their own worst enemies and do themselves a mischief each time they assail their neighbors. The great majority of the profession are peacefully inclined. Their pursuits are eminently humanizing, and they look with disgust on the personalities which intrude themselves into the placid domain of an art whose province is to heal and not to wound."

Your Medico-legal advisory committee brings this quotation to you with the hopes that after reading it, you will make a resolution towards your fellow members of the association in accord with the beautiful thought it contains. *Remember that ill conceived criticism of the former physicians on the case, accounts for the fact that 51 per cent of the cases in Minnesota are started within the walls of a doctor's office.*

B. J. BRANTON, M.D.

Medical Care For Pensioners

Minnesota recipients of old age pensions under the Social Security Act and the new Minnesota law, will be allowed medical, dental, surgical or hospital assistance, or nursing care in addition to their pensions.

This provision was introduced into the bill through the interest and assistance of State Senators Dr. J. L. McLeod of Grand Rapids, Dr. C. I. Oliver of Graceville and Representative Carl J. Eastvold of Ortonville after consultation with the Committee on Public Policy and Legislation of the State Association, of which Dr. L. L. Sogge of Windom is chairman.

The provision reads (c, under Section 5):

"While a recipient is receiving old age assistance, he shall not receive any other relief from the state or from any political subdivision thereof, except for medical, dental, surgical or hospital assistance or nursing care."

The final bill was in the hands of conferees from the Senate and the House at the time this issue went to press and was certain of passage pending the adjustment of certain differences. The matter of medical care for recipients was not in dispute.

Local Units Responsible

Legislators readily appreciated the impossibility of paying medical and hospital fees on a pension of thirty dollars a month, the maximum limit set in the bill.

The understanding of the Legislative Committee is that the payment for these specified services for recipients of pensions would become the responsibility of the county commissioners in counties that are on the "county plan" of care for the poor and upon the town board in localities that are on the "township plan."

Here again is a job for the Contact Committees of Three. Difficulties and misunderstandings about the application of the law to payment for medical care for pensioners are sure to occur unless physicians are prompt about making explicit arrangements with responsible local officials.

No Exceptions

The special session that is now terminating was marked by several attempts to make legislative exceptions in behalf of individuals to the provisions of the Basic Science Law.

Such individual exceptions carry a serious threat to the vitality of the Basic Science law. The importance of keeping legislators informed of this danger is obvious. The Legislative Committee is to be complimented on the effectiveness with which it prevented the passage of all such legislation at this session.

Short of Cash

The relief problem in Minnesota is currently complicated by a serious deficit in funds.

It is estimated by the relief officials and confirmed by a House investigating committee that \$16,000,000 will be needed to take care of the direct relief load in Minnesota this year.

No method of lining up available funds and prospective appropriations could be made to add up to the total amount, however, and the legislature threatened to adjourn as this issue went to press, \$3,750,000 short of the total amount needed.

The investigating committee recommended that \$3,000,000 of the \$5,000,000 appropriation which becomes available July 1, be made available immediately to care for the current budget of the SERA. Without this action, complete cessation of all direct state relief faced relief offices on February 1.

Obviously, the status of direct relief in Minnesota is precarious and uncertain. It will be necessary to get additional federal aid, in the

opinion of most legislators, to meet the 1936 budget. SERA may be forced to close down entirely or drastically to cut its disbursements at any time.

Physicians everywhere, whether in counties that have joined in the state relief program or not, will do well to keep in constant touch with the trend of relief affairs and with their local county and relief officials.

This is the job of the Contact Committees. Their mission was never so important as *now*.

New Assistant to the Secretary: R. R. Rosell

Mr. R. R. Rosell, formerly field representative of the National Food Bureau, and more recently, Director for the WPA, has joined the headquarters staff of the Minnesota State Medical Association as assistant to the secretary.

At one time assistant to the regional director of the United States Veterans Administration, and Director of Rehabilitation and Re-education for the Minnesota Public Health Association, Mr. Rosell is experienced in organization work and thoroughly familiar with government and state agencies and their officials.

The Minnesota State Medical Association will unquestionably find itself obliged to co-operate much more closely than ever before, as a result of social security legislation and relief activities in general, with various public agencies.

The selection of Mr. Rosell to assist in the conduct of this phase of the organization's activities is therefore especially appropriate. He will, as Secretary E. A. Meyerding directs, keep in close touch with negotiations in all parts of the state with county commissioners and relief officers in the conduct of medical care for the indigent and unemployed and do much, it is hoped, to facilitate medical coöperation in the New Deal program for 1936.

Foundation Studies

Various individual physicians throughout the state have received letters from the American Foundation Studies in Government during the last few months.

These letters courteously requested the physicians' informal views on present methods

of medical practice and the degree to which medicine is now fulfilling its functions.

The names on the letterhead, including Karl T. Compton, Massachusetts Institute of Technology, as president; Curtis Bok, chairman; Robert A. Millikan, Thomas W. Lamont, James D. Mooney, Roscoe Pound, Mrs. Ogden Reid, Elihu Root, Hugh L. Cooper, Dr. Truman G. Schnabel, Bishop William Scarlett, Mrs. F. A. Vanderlip, John G. Winant, Elizabeth F. Read with Esther Everett Lape as member in charge were impressive.

Purposes

Investigation of the purposes of the Foundation revealed the following which is quoted from a report made by Dr. R. G. Leland, Chicago, Director of the Bureau of Medical Economics, after a personal interview with Miss Lape, member in charge.

Miss Lape said:

"The Foundation has nothing to prove or to demonstrate to the Foundation Board.

"Neither the Foundation members nor the staff in charge have any preconceived notions, plans, programs or propaganda.

"The study is to be confined to an endeavor to secure from practicing physicians statements of the factors involved in medical practice, opinions as to the extent to which the practice of medicine is fulfilling its functions, and expressions of the manner in which deficiencies or shortcomings in medical practice may be corrected if, and where, found.

"The Foundation desires to secure honest, complete and well considered statements and that the correspondents' names will be withheld when desired."

Anxiety Expressed

Miss Lape expressed several times, according to Dr. Leland, her anxiety over the activities of the small group in Washington which is attempting to change completely the existing social order. She expressed feelingly deep concern over the possibility of extending these reforms into the field of medicine. She was frank in expressing her opinion that these reforms might be merely a passing fancy, but if applied to medicine would result in a much greater social disaster than in other fields.

Dr. Leland was careful to note, however, that the opinions expressed were not his.

The Foundation has engaged in other studies including the Press Poll of Views of the World Court, and Views on Russian Recognition.

Its sponsors disclaim for it any objective ex-

cept to present in an educational and informative way actual, uncolored facts and opinions.

Founder

The Foundation was established by the late Edward Bok of the Curtis Publishing Company in 1925. Its total endowment in 1930 was \$2,000,000. Its Board of Directors is preponderantly conservative, barring Bishop Scarlett who, in spite of his affiliation with the Protestant Episcopal Church, is sometimes referred to as a radical.

The sustaining activity of the Foundation today is said to be a study of parliamentary government here and abroad.

Washington's "Medical Factories"

A large number of plans for care of the sick by pre-payment methods are being tried out in the state of Washington.

Some of them are under medical society management. Others are individual undertakings, like the one operated by Dr. A. W. Bridge in Tacoma. Dr. Bridge had some interesting Associated Press publicity on his organization recently.

According to a breezy story carried by the Associated Press, Dr. Bridge has adapted "big business" tactics to his practice. He has a "medical factory" with a staff of thirty doctors and 10,000 patients on contract to pay \$1.50 a month. He operates his own hospital, drug store commissary and garden and reaps a profit.

Headed by Dr. Hopkins

Dr. Lewis A. Hopkins, brother of Relief Administrator Harry Hopkins, is president of another pre-payment service plan. This one is sponsored by the Pierce County Medical Society. Contracts for the latter also cost the patient about the same amount though a similar amount is also paid by the patient's employer. This Pierce County Industrial Medical Bureau also had its share of mention in the same story as did another organization owned by a group of doctors.

Experiments of this type flourish on the North Pacific Coast. Doctors justify them on the ground that lumber companies and other commercial organizations have long had such schemes and that the latter were full of abuses.

The commercial organizations forced the issue.

Not Happy

That all Washington physicians are not happy over the state of affairs is evidenced by a letter printed in a recent issue of Oregon's "Medical Reporter" from Dr. Alexander Hamilton Peacock, of Seattle, former president of the Washington State Medical Association, and former chairman of the association's Medical Economics Committee.

Says Dr. Peacock:

"When president of the Washington State Association and chairman of the Economics Committee, I went out of my way to make a study of this subject of taking care of the sick by mass methods. We have, of course, the various European systems to study and to observe. These I will not comment on as you are familiar with their good points and their weak ones.

Fees too Low

"Our own County Medical Service Bureaus, however, are another thing altogether. Here we can observe their workings out under our eyes and see the general trend. In the first place, they are taking care of the sick at a fee much below the actual cost. Good medical service cannot be given at any such figure. It means that the costs are coming out of the doctors' income. In the second place, they are educating the public to a very low medical insurance fee. The laity believe that good medical service can be obtainable at such a figure, if many of the well-known doctors and surgeons enter into such an agreement with them. This is establishing a low basis for a general insurance plan.

Spreads to Large Incomes

"In the third place, this plan initiated by organized medicine, instead of being limited to the industrial hazards, is rapidly spreading until it is covering a large number of the incomes of the county. It was, originally, intended to keep out of the field commercial hospital associations and some of the doctors who are considered to be on the outside of ethical medicine. Instead of driving them out they have increased the number of their contracts and the bureau itself has been obliged to get its clients from an entirely different field, that is, clerks and the white-collared class. While decrying state or federal medicine, they have laid a beautiful plan for the general medical care of the whole community. Of course, this is driving out private practice and everybody who possibly can is coming under the bureau service. The ultimate end of such a policy is quite apparent to everyone.

For Old Method

"My observations are that the service bureau is carried on under the idea that it is necessary, that a

great many of the men are heartily out of sympathy with it and are afraid of its ultimate results, that if they could possibly do so they would withdraw from the bureau but are afraid on account of political reasons. The present plan in most of the bureaus is the modified panel system with the doctors carrying the entire load of hospitalization as well as medical service. The action of the bureau is analogous to the great profit before the country of those who believe in security and those who believe in the competitive profit system. There can be no compromise of two, it must be either one or the other. Personally, I am for the old method of competition, based on personality and good medical service."

More For Their Money

From a recent United States News Column signed by Derek Fox:

"Walton H. Hamilton, President's Adviser on Consumer Problems and Director of the Government's new Consumers' Division, has formed a 'Consumers' Cabinet' of nationally known experts on economic and consumers' problems and is rapidly shaping plans for getting the buying public more for its money.

"One of the aims of the organizations is said to be in the field of medical costs to the average citizen. Suggested by Mr. Hamilton was a family budget or insurance plan for paying doctors' bills.

"This does not mean that the doctor shall receive less," he explained, pointing out that if families lay aside a certain amount either through a special budget or insurance for a special purpose, the number of those who can pay their doctors' bills will be larger and therefore the cost to the patient probably will be curtailed.

"Already the United States Public Health Service has started its house-to-house canvass in 19 states to ascertain the adequacy of health facilities, the extent to which they are used and other information.

"Findings from this survey will be analyzed by the 'Consumers' Cabinet'."

Vitamin C and Infection

Few more cogent examples of the justification for the painstaking and deliberate methods of scientific research have developed than is shown in the story of cevitamic acid (vitamin C). Once the evidence had been obtained that a deficiency in this food factor could be produced at will in experimental animals, great effort was made to find sources of it in nature. Concentrates were made from the richest of these and, when they had been sufficiently purified, the chemical constitution was at length established. The goal of this study was reached in 1933, when the synthesis of cevitamic acid was achieved. Perhaps the story is the more thrilling because of the long history of the tacit

Minnesota State Board Of Medical Examiners

Saint Paul Abortinist Sentenced to Four Years at Shakopee

State of Minnesota vs. Della Mostert

Della Mostert, fifty-six years of age, 1785 E. Maryland Street, Saint Paul, Minnesota, was sentenced on January 7, 1936, to a term of not to exceed four years at hard labor at the Woman's Reformatory at Shakopee, following her plea of guilty to an indictment charging her with the crime of abortion. The sentence was imposed by the Honorable R. A. Walsh, Judge of the District Court for Ramsey County.



Mrs. MOSTERT

Mrs. Mostert, who has no medical training or education whatever, but who for some time has been doing work as a practical nurse and operating a rest home, admitted to Judge Walsh that she had been engaged in this illegal work for the past seven or eight years. In the present case an eighteen-year-old girl went to the home of Mrs. Mostert on November 15, 1935, for the purpose of having an abortion performed. Arrangements had been made previously by a young man who paid Mrs. Mostert the sum of \$45.00. Within thirty-six hours after the performing of the abortion by Mrs. Mostert, the girl was dead. The cause of death was given as gas bacillus. A complete postmortum examination was not made and it was decided to permit Mrs. Mostert to enter a plea of guilty to the crime of abortion rather than to try her on a charge of manslaughter. The Grand Jury in indicting Mrs. Mostert, returned two indictments; one for manslaughter in the first degree and one for abortion.

For some time reports have been coming to the State Board of Medical Examiners in reference to Mrs. Mostert. The Board did not feel justified, however, in presenting the facts to the County Attorney's office until the present case. This case is a perfect example of the damage done by an ignorant quack. When the girl showed signs of becoming seriously ill Mrs. Mostert applied a plaster to her side. Finally a physician was summoned, but the girl was dead.

The State was represented by Mr. James Lynch and Mr. William F. Desmond, assistants to Mr. M. F. Kinkhead, County Attorney. Mrs. Mostert was represented by Mr. George L. Siegel.

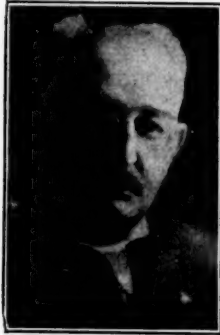
recognition of human scurvy as a deficiency disorder. The value of cevitamic acid as a preventive and cure of human and experimental scurvy has been demonstrated repeatedly. Jungblut and Zwemer have recently reported that diphtheria toxin is inactivated by vitamin C in vitro. Furthermore, cevitamic acid seems to be able to protect guinea-pigs against the fatal outcome of diphtheria intoxication. Similar studies of King and Menten have demonstrated the marked influence of vitamin C in promoting the resistance of guinea-pigs to diphtheria toxin. These conclusions seem to indicate that cevitamic acid bears a relation to immunologic reactions.—(J. A. M. A., November 16, 1935, p. 1609.)

OBITUARY

Justus Ohage
1849-1935

DR. JUSTUS OHAGE of Saint Paul died at his home, December 26, 1935, at the age of eighty-six.

Dr. Ohage, son of Dr. Georg Ohage, whose father was also a doctor, was born in Hannover, Germany, October 13, 1849. While attending the gymnasium in that city, his spirit of adventure led him, at the age of fifteen, to make a run-away trip to the United States to join the northern forces in the Civil War. As a wounded soldier in the hospital at City Point, Virginia, on the occasion of a visit to the institution by Abraham Lincoln, he received, from the President, a handshake and an expression of thanks for his bravery and service.



DR. JUSTUS OHAGE

Returning to Hannover he pursued his studies, which were again interrupted when he served as a stretcher bearer in the Franco-Prussian war of 1870. After sailing before the mast he again returned to the United States to serve as a medical assistant on the construction crew of the Topeka Atchison railroad.

Later he made a hunting trip with his brother, Georg, to the wilds of the Northwest, where he was later to make his home. In 1876, he returned to Missouri, and it was there that he met a medical student, Thomas Ensor, who had similar tastes in outdoor life. Thomas Ensor was the son of Dr. Sidney Ensor, a graduate of Guy's Hospital, London, and on May 10, 1877, Dr. Ohage married Dr. Ensor's daughter, Augusta.

Pursuing his medical studies at the University of Missouri, Dr. Ohage received his medical degree in 1880. Taking his family with him, he spent a year in intensive post-graduate work at Göttingen, Kiel, Berlin, Edinburgh and London.

Dr. Ohage began practice in Saint Paul in 1881, in offices at Seventh and Wacouta Streets, shared with Dr. Parks Ritchie and Dr. Edward Spencer.

As an illustration of Dr. Ohage's bold spirit, he performed the first cholecystectomy in the United States, at St. Joseph's Hospital, September 24, 1886. The patient survived forty-three years following the operation, and in 1930 Dr. Ohage received tribute for his pioneer work in surgery from the International Postgraduate Medical Association of North America.

Dr. Ohage was president of the Ramsey County

Medical Society in 1889 and 1890, president of the Minnesota State Medical Association in 1895, a charter member of the Minnesota Academy of Medicine, clinical professor of surgery at the University of Minnesota from 1890 to 1899 and a member of the Imperial Surgical Society of Berlin.

In 1899, Dr. Ohage became health officer of Saint Paul. Against vigorous opposition he pursued a spirited program of reform. Pure food laws were enforced, birth and death certificates were filed in an orderly system and compulsory vaccination in the schools was adopted. He even succeeded in abolishing the smoke nuisance. Undoubtedly, as a result of his vigorous policies, Saint Paul was declared the healthiest city in the world at the Saint Louis World's Fair in 1904, and Dr. Ohage was awarded a medal for having made it so.

As an illustration of Dr. Ohage's public spirit, he presented Harriet Island to the city for use as a recreation park and bathing beach. The subsequent pollution of the river prevented the development of the island, but it is to be hoped that the new sewage disposal plant now under construction will permit the realization of Dr. Ohage's plan.

In 1918, Dr. Ohage resigned as health officer and returned to private practice, which he continued until he gave up his office a few years ago on account of physical infirmities.

Dr. Ohage was an ardent lover of the great outdoors and a great hunter and fisherman. He wrote his adventures in a book entitled "Sixty years With Rod and Gun" which was privately printed and distributed to friends.

Surviving are three daughters, Ada and Louise Ohage of Saint Paul, Mrs. Emil S. Geist of Minneapolis, and one son, Dr. Justus Ohage, Jr., of Saint Paul.

Floyd S. Kidd
1883-1935

DR. FLOYD S. KIDD, member of the medical staff at the Veterans' Hospital, Minneapolis, died suddenly December 30, 1935, at the age of fifty-two.

Dr. Kidd was born in Glenn Haven, Wisconsin, in 1883, where he received his preliminary education, graduating from the University of Iowa medical school. He practiced at Mitchell and Woonsocket, South Dakota, until he joined the medical corps of the Army at the outbreak of the war. Following the war he resumed practice until 1928, when he joined the staff of the Veterans' Bureau.

Dr. Kidd is survived by his widow, two daughters, Mrs. Iowa M. Kraft, Saint Paul, and Miss Helen M. Kidd, Minneapolis; his mother, Mrs. Florence Kidd of Mitchell, S. D., and a brother, J. E. Kidd of Tacoma.

OBITUARY

Perry Harris Munger

1861-1935

PERRY HARRIS MUNGER was born February 2, 1861, at Piqua, Ohio. He was graduated from the University of Michigan, in 1889, and had practiced in Minnesota since 1892, at St. James, Nicollet and St. Paul Park. Dr. Munger had suffered a long illness and was not in practice at the time of his death, which occurred September 8, 1935. He is survived by his widow, three sons and a daughter.

John Moresby Rains

1850-1935

DR. JOHN M. RAINS, Willmar, died at his home November 10, 1935, in his eighty-fifth year.

Dr. Rains was born November 23, 1850, in Toronto, Canada, the son of John and Maria (McCord) Rains. He received his early education at the Model and Heber Grammar Schools conducted privately by the Masters of the English (Episcopalian) Church. He then entered a military school for cavalry officers, becoming a member of the Governor General's Horseguards.

Studying medicine at Victoria College, later affiliated with the present University of Toronto, he graduated in 1870 at the age of twenty, too young to practice in Canada. After travelling in the United States, he located in the State of Michigan. In 1877 he married Frances Augusta Burnett of Jackson, Michigan, and in 1879 moved to Willmar, Minnesota, at the suggestion of another pioneer physician, Dr. E. S. Frost. He remained there in active practice continuously until a few years before his death.

Two daughters were born to Dr. and Mrs. Rains in Willmar: Helen Gertrude (Mrs. Harry L. Beckjord) of Duluth, and Ethel Isabelle (the late Mrs. A. W. Cleveland) also of Duluth. He leaves one granddaughter, Georgiana Cleveland, and two grandsons, Warner Rains Cleveland and Philip Rains Beckjord of Duluth.

Dr. Rains acted as pension examiner from 1880 on and held the office of Health Officer of Willmar from 1890 to 1933. We was also chairman of the Civilian Relief, Kandiyohi Chapter of the American Red Cross, from 1917 to 1925, having been a member of the Board of Directors of that organization from its origin in 1917 to 1927. He was also a charter member of the Willmar Chamber of Commerce, a member of the Masonic Lodge and Kiwanis Club and served on the City Park Board from 1910 to 1914.

Dr. Rains was a member of the Kandiyohi-Swift County Medical Society, the Minnesota State and American Medical Associations. He led a long and useful life. He was a great leader and lover of flowers and his hobby was the cultivation of fine roses.

Emory C. Rebman

1885-1936

DR. EMORY C. REBMAN, president of the Austin Clinic since 1931, died at the Worrell Hospital, Rochester, January 7, 1936, from pneumonococcus meningitis complicating an ear infection.

Dr. Rebman was born January 18, 1885, at Forreston, Illinois. At the age of six the family moved to Pipestone, Minnesota, where he attended grade and high school. He studied medicine at Ann Arbor, taking his final year at Northwestern University, Chicago. He received his medical degree in 1909, and was married the same year to Margaret Cawley of Pipestone.

First practicing at Truman, Minnesota, for two years, Dr. Rebman moved to Austin in 1912 to be associated with the late Dr. C. F. Lewis. In 1919 they founded the Austin Clinic with Dr. C. C. Allen and Dr. W. B. Grise. Later the clinic built its present building. On the death of Dr. Lewis in 1931, Dr. Rebman was elected president of the group. As a charter member of the local Rotary Club Dr. Rebman was active in local affairs and as a member of the staff of St. Olaf Hospital and at one time chief of staff he contributed much to the welfare of the hospital.

The Bactericidal and Bacteriostatic Effects of Mercurochrome

The comparative evaluation of antiseptics involves many difficulties. Adequate standard methods have not yet been developed; consequently studies in this field by different workers are rarely comparable. This has led to great confusion and much controversy. An article by Justina H. Hill of the Brady Urological Institute (whence mercurochrome originated) concerning the action of mercurochrome in comparison with some other preparations on normal human skin and in infected wounds in animals, appears in *The Journal*, July 13, 1935, p. 100. Miss Hill presents an extensive series of experiments on the comparative bactericidal and bacteriostatic effects of 2 per cent aqueous and 2 per cent acetone-alcohol-aqueous solutions of mercurochrome and of tincture of iodine applied to normal human skin. She concludes from her investigations that the acetone-alcohol-aqueous solution is superior for this purpose to the aqueous preparation, and that the acetone-alcohol-aqueous solution, under the conditions of her tests, exerted greater bacteriostatic effects than 7 per cent tincture of iodine. Comparative studies on the effects of the two preparations of mercurochrome, 7 per cent tincture of iodine, tincture of merthiolate, aqueous solution of methiolate, tincture of metaphen, neutral acriflavine in salt solution, and hexylresorcinol solution, on subcutaneous wounds inoculated with *Staphylococcus aureus*, indicated that the 2 per cent aqueous solution of mercurochrome was superior to all the others in reducing the number of organisms and in producing the least interference with phagocytosis. It appears from other studies which have been made that most workers have found mercurochrome to be a relatively weak antiseptic. This is not contradicted by the data presented by Miss Hill; the results of her investigations, so far as they appear to be fully valid, supplement rather than conflict with those of the other studies. It must be appreciated that the alleged superiority of any antiseptic, and, in this case, of mercurochrome, is dependent on the conditions under which this superiority was demonstrated. The consensus appears to be that mercurochrome is a moderately active antiseptic; it is relatively non-irritant and it has a certain definite but quite limited usefulness in the prevention and treatment of certain infections. (*J. A. M. A.*, July 13, 1935, p. 123.)

OF GENERAL INTEREST

Dr. George D. Doroshow has opened an office at 1035 Lowry Medical Arts Building, Saint Paul, with practice limited to pediatrics.

* * *

Dr. James C. Masson was recently appointed chief of the surgical staff of the Mayo Clinic to succeed the late Dr. Edward Starr Judd.

* * *

F. Manley Brist, attorney for the Minnesota State Board of Medical Examiners, is recovering from pneumonia at the Miller Hospital, Saint Paul.

* * *

Dr. O. J. Hagen, for the past five years a Regent of the University of Minnesota, was recently elected president of the Association of Governing Boards of State Universities.

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Dr. J. Allen Wilson, formerly with the Earl Clinic, has opened offices at 836 Lowry Medical Arts Building, Saint Paul, where he will limit his practice to internal medicine, with special reference to gastro-enterology.

* * *

Dr. Benjamin B. Souster has opened an office at 836 Lowry Medical Arts Building, Saint Paul, for the practice of internal medicine. Dr. Souster has been associated with the Earl Clinic for a number of years.

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Dr. H. M. N. Wynne of Minneapolis spoke before the Interurban Academy of Medicine (Superior and Duluth) at the regular meeting, January 15. He spoke upon the subject, "Remarks Concerning Hysterectomy."

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Dr. Edward L. Tuohy addressed a meeting of the Gogebic County Medical Society, Ironwood, Mich., on the evening of January 21. He discussed, "The Bone Marrow and Its Relation to Certain Hematopoietic Disorders."

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Dr. Gage Clement, roentgenologist at St. Mary's Hospital, Duluth, is convalescing from a serious pneumonia with an empyemic complication. His numerous friends will be pleased to know that he is assured an early complete recovery.

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At the Camp Release Medical Society meeting in Dawson, Minnesota, on January 9, Dr. Myron O. Henry of Minneapolis spoke on "Legal Pointers," and Dr. W. A. Fansler of Minneapolis spoke on "Injection Treatment of Rectal Diseases."

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Dr. J. W. Edwards recently opened offices at 1149 Lowry Medical Arts Building, Saint Paul. Dr. Edwards practiced at South Saint Paul for a number of years before moving to Chicago, where he has been in general practice for several years.

* * *

St. Luke's Hospital, Duluth, held its annual banquet

for its staff, with election of officers, on the evening of January 16. The address of the evening was given by Lloyd Gillmett, rector of St. Paul's Episcopal Church. Dr. D. W. Wheeler was elected Chief of Staff.

* * *

Dr. W. R. Bagley of Duluth, former president of the Isaac Walton League, together with Mr. Valentine Saxby of the Arrowhead Association, have been appointed delegates from Minnesota to a forthcoming "Conference on Wild Life Conservation" at Washington, D. C. Some of Dr. Bagley's friends have been asking him whether this assignment includes the genus homo sap!

* * *

Correction.—In the article by Dr. H. M. Weber, entitled, "Roentgenologic Manifestations of Diseases which Have Dysentery as a Prominent Symptom," which appeared in MINNESOTA MEDICINE, page 23, January, 1936, the following errors occurred: (1) page 25, left-hand column, line 28, should read "and tuberculous intestinal processes are not infrequently encountered;" (2) page 29, left-hand column, line 11 should read, "there are no positive roentgenologic signs of benignancy."

* * *

The American Association for the Study of Goiter again offers the Van Meter Prize Award of \$300.00 and two honorable mentions for the best essays submitted on the goiter problem. This award will be made at the discretion of the Society at its next annual meeting to be held in Chicago, Illinois, on June 8, 9, and 10.

The competing manuscripts, which should not exceed 3,000 words in length, must be presented in English and a typewritten double spaced copy sent to the Corresponding Secretary, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than March 1, 1936. Manuscripts received after this date will be held for competition the next year or returned at the author's request.

* * *

Warning

The Minneapolis police hold a warrant for the arrest of a man by the name of Olaf Edwardson, wanted for forgery. He has imposed on a number of physicians throughout the state and, if encountered, any police officer or sheriff, the State Bureau of Criminal Apprehension of the Minneapolis or Saint Paul police, should be notified.



OLAF EDWARDSON
dark blue eyes, complexion medium, of Norwegian descent; occupation, barber.

The man is described as:
Age 40; height five feet seven inches, weight 155 pounds, medium dark chestnut hair, bald, medium

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for February

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 10:00 A. M. every Monday, over Station WCCO, Minneapolis and St. Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month will be as follows:

February 3—Value of Colonic Irrigations.

February 10—Toothache.

February 17—Diet and Health.

February 24—Care of the Eyes.

Northwest Regional Conference

Following is the program for the Northwest Regional Conference which will be held in Chicago at the Palmer House, February 16, this year:

8:30 A. M.—Breakfast. (Red Lacquer Room.)

9:30 A. M.—Registration.

10:00 A. M.—Morning Session.

1. "The Social Security Act and Its Relation to The Medical Profession."

T. V. McDAVITT, American Medical Association, Chicago.

Discussion opened by A. D. McCannel, M.D., Minot, North Dakota, and Chas. B. Reed, M.D., Chicago.

2. "Reciprocal Relations Between State Medical Societies."

HAROLD M. CAMP, M.D., Monmouth, Illinois.

Discussion opened by A. S. Rider, M.D., Flandreau, South Dakota, and F. S. Crockett, M.D., LaFayette, Ind.

12:30 P. M.—Luncheon (with the compliments of the Illinois State Medical Society).

President's Address:

OLIVER J. FAY, M.D., Des Moines, Iowa.

Election of Officers for 1937.

Selection of meeting place for next annual meeting.

Introduction of guests.

2:00 P. M.—Afternoon Session.

1. "Standardization of the Activities of the Committees on Medical Economics of Mid-West and Northwest."

F. L. LOVELAND, M.D., Topeka, Kansas.

Discussion opened by E. A. Meyerdig, M.D., St. Paul, Minnesota, and W. H. Marshall, M.D., Flint, Michigan.

2. "Interprofessional Relations in the County."

FRED MOORE, M.D., Des Moines, Iowa.

Discussion opened by L. W. Larson, M.D., Bismarck, North Dakota, and J. M. Hayes, M.D., Minneapolis, Minnesota.

Papers will be limited to twenty minutes each, and discussions to ten minutes; at the completion of same, papers will be open for general discussion.

Kindly address any inquiry to the Secretary, E. S. Hamilton, M.D., Kankakee, Illinois.

American College of Surgeons Sectional Meeting

The American College of Surgeons 1936 Sectional Meeting in Omaha, Nebraska, will be held on Wednesday, Thursday, and Friday, March 11, 12, and 13. Headquarters will be at Hotel Paxton.

Participating states: Nebraska, Iowa, Wyoming, North Dakota, South Dakota, Minnesota, Kansas, and Colorado.

A Committee on Local Arrangements is headed by Dr. Herman F. Johnson as chairman, and Dr. William L. Shearer as secretary.

Some of the distinguished visitors who will be present on this occasion are: Dr. George Crile, Cleveland, Chairman, Board of Regents, American College of Surgeons; Dr. A. W. Adson, Rochester, Neurosurgeon, Mayo Clinic; Dr. Frank E. Adair, New York, Attending Surgeon, Memorial Hospital; Dr. Charles L. Scudder, Boston, Consulting Surgeon, Massachusetts General Hospital; Dr. Robert H. Kennedy, New York, Surgical Director, Beekman Street Hospital; Dr. Frederic A. Besley, Waukegan, Professor of Surgery, Northwestern University Medical School; C. C. Little, Sc.D., New York, Managing Director, American Society for the Control of Cancer; Dr. M. T. MacEachern and Dr. Bowman C. Crowell, Chicago, Associate Directors, American College of Surgeons; and Robert Jolly, Houston, Superintendent, Memorial Hospital and Past President, American Hospital Association.

A cordial invitation to attend this most interesting meeting is extended not only to the Fellows and hospitals of the various states included, but to the entire medical profession at large.

State Meeting

Six famous out-of-state medical men have already consented to speak before the 83rd annual three-day session of the Minnesota State Medical Association to be held in Rochester, May 4, 5 and 6.

They are Dr. Willis F. Manges, Philadelphia radiologist, who will deliver the third annual Russell D. Carman lecture under Minnesota Radiological Society auspices; Dr. Elliott P. Joslin of Boston who will talk on diabetes; Dr. F. A. Coller, of Ann Arbor, Michigan; Dr. Donald Guthrie, of Sayre, Pennsylvania; Dr. J. Tate Mason, Seattle, president of the American

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Association, and Dr. Olin West, of Chicago, the association's general manager.

Invitation has also gone to Dr. Max Cutler, Micheal Reese Hospital, Chicago, to deliver the Citizen's Aid Society lecture on cancer.

As the program is now arranged, the first two hours of each day's program from 8:30 a. m., to 10:30 a. m., will be devoted to clinics to be given by Rochester men at St. Mary's hospital. The half hour from 10:30 to 11:00 each morning will be devoted to inspection of the scientific and technical exhibits to be held at St. Mary's Nurses Home. The hour from 11 to 12 each day will be given over to lectures by the visiting headliners, also the first hour after lunch. These lectures and the afternoon papers will be given in the hall at the nurses' home.

There will be another half hour for the exhibits in the afternoon, from 2:45 to 3:15 p. m., followed, each day, by a series of papers exclusively by Minnesota men.

The usual evening medical economics meeting will be held Monday evening with Dr. West, Dr. Mason and Mrs. J. W. Robb of Detroit, representing the Women's Auxiliary, as guest speakers.

An innovation which is to take the form, according to present plans, of a crime study meeting will be substituted for the usual banquet meeting Tuesday night.

This meeting will be held at the Armory and, among speakers already invited, are famous "G-Men" from Washington, including ballistic experts, finger print experts and others. A massive exhibit of the recent brilliant work of the department of Justice will be sent to the meeting by Mr. J. Edgar Hoover, of the department. This exhibit will be at the armory at the time of the meeting and may also be on display for the public at appropriate hours.

Business meetings of the association, including Council and House of Delegates meetings, will start at the Kahler Hotel, Sunday, May 3.

County Officers' Conference

Saturday, February 29, is the date chosen for the annual County Officers' Conference to be held at the Lowry Hotel in Saint Paul.

Sessions will open at 8 a. m., with a breakfast and Round Table discussion. Since the first of the breakfast meetings, held two years ago, these informal discussions have proven to be one of the most valuable of the day's sessions, and all officers are especially urged to be there.

Important among the subjects to be discussed throughout the day are Social Security, and the Social Security Act with its probable effects upon public health and the practice of medicine; Medical Relief for the Indigent and Low Income Group; the Chronic Disease Survey; the High School Debates and the Special Session of the Legislature, recently adjourned.

Dr. W. W. Bauer, director of the Bureau of Public Health and Instruction of the American Medical Association, will come from Chicago to discuss the Social

Security program. Among other important guest speakers for the day's session are Mr. Victor Christgau, WPA Administrator for Minnesota, and Mr. R. E. Youngdahl, director of SERA.

Narcotic and Liquor Law Violations, Malpractice, Workman's Compensation, Credit and Collection Bureaus and the Dakota County Plan are among the subjects to be considered informally at the breakfast session.

The morning program will include also a "Secretary's Travelogue" by Dr. M. C. Piper, Rochester; "My Experience as a Full-Time Secretary," by Mr. J. H. Baker, executive secretary, Hennepin County Medical Society; a report on the legislative session by Dr. L. L. Sogge, Windom, chairman of the Committee on Public Policy and Legislation, and also a report on the Northwest Regional Conference which is to be held this month in Chicago by Dr. W. F. Braach, chairman of the Committee on Medical Economics, Rochester. A report on experiences throughout the state with high school debates on state medicine, subject for the current year, will complete the morning program.

The afternoon will be devoted to the Social Security program with Dr. A. J. Chesley, State Health Officer, following Dr. Bauer as speaker, and a summary by Dr. Sogge; also Medical Relief and the Chronic Disease Survey with Dr. Bauer, Dr. T. H. Sweetser, Minneapolis, chairman of the State Health Relations Committee, Mr. Christgau, Mr. Loungdahl, Dr. E. A. Meyerding, Saint Paul, secretary of the state association, and Mr. R. R. Rosell, assistant to the secretary, as speakers.

Dr. W. W. Will, Bertha, president of the State Medical Association, will preside at the noon luncheon and the afternoon sessions. Dr. Meyerding will preside at the breakfast and morning sessions.

Mississippi Valley Medical Society

The second annual meeting of the Mississippi Valley Medical Society will be held at the Hotel Burlington, Burlington, Iowa, September 30, October 1 and 2, 1936.

The first meeting, held at Quincy, Illinois, last October, was most successful. There were 300 registered from ten states, with forty-eight papers read by thirty-six clinicians. Plans are under way to augment the present membership and to make the Burlington Assembly, in 1936, the largest medical meeting ever held in southeastern Iowa. The board of directors, at their recent meeting, voted to continue the \$5.00 fee for membership and first year's dues; \$2.00 for annual dues, and \$3.00 registration fee for non-members at the annual meeting.

Clay-Becker County Society

The annual officers of the Clay-Becker County Medical Society are: President, J. W. Duncan, Moorhead; vice president, A. R. Ellingson, Detroit Lakes; secretary-treasurer, L. H. Flancher, Lake Park.

WOMAN'S AUXILIARY

Clarence Martin Jackson Lectureship

The third annual address in the Clarence Martin Jackson Lectureship of Phi Beta Phi Medical Fraternity will be given by Dr. Russell L. Haden of The Cleveland Clinic, at 8:15 o'clock, on Wednesday, February 5, in the Medical Sciences Amphitheater, at the University of Minnesota. Dr. Haden's subject will be "The Human Red Blood Cell." All who are interested are invited, by the fraternity, to attend.

Rice County Joint Meeting

A joint dinner meeting of the Rice County Medical and Dental Societies was held Thursday, January 23, at 6:30 p. m., in the Faribault Hotel for the consideration of the Social Security Act. Dr. C. E. Rudolph, of the University of Minnesota, was the speaker. Dinner was served at 6:30 p. m.

C. J. PLONSKE, *Secretary.*

Washington County

Officers of the Washington County Medical Society have arranged for four lectures on fractures for the benefit of members. Some sixty invitations to attend the lectures have been extended to physicians located in Minnesota and Wisconsin, in the vicinity of Stillwater.

The first lecture, on Fractures of the Hip, was given at the regular meeting, January 4, 1936, by Dr. A. A. Zierold of the University.

WOMAN'S AUXILIARY

MRS. F. J. ELIAS, *President*, Duluth, Minn.
MRS. L. W. BARRY, *Editor, Press and Publicity*,
2193 Sargent Ave., St. Paul, Minn.

The radio plaque offered by the Woman's Auxiliary of the Minnesota State Medical Association in the fifth annual high school public speaking contest in connection with the Christmas Seal campaign was won by the Worthington High School. The winning talk was broadcast by Miss Ruth Mixa of the school, one of the ten students in the final WCCO broadcasts. The contest is conducted annually by the Minnesota Public Health Association with the coöperation of the Woman's Auxiliary, and WCCO.

Announcement of the winner of the plaque was made over WCCO by Mrs. F. J. Elias of Duluth, president of the Woman's Auxiliary. The ten gold medals offered by the Auxiliary to the students whose outstanding talks won them an opportunity to broadcast were awarded to the following on the occasion of their broadcasts: Ruth Mixa, Worthington High School, finalist in the contest; Ethel Watson, Johnson High School, St. Paul; Katherine Riikols, Memorial High School, Ely; Mary C. Waskuwich, Bethlehem Academy, Faribault; Ted Boer, Vocational High School, Minneapolis; Ann Mary Chidester, Stillwater High School; Verna Thysell, State Teachers' College High

School, Moorhead; Helen King, Randolph Public School; Myrna Anderson, Greenway Junior High School, Coleraine; Patricia Sanger, Deer River High School.

More than 100 talks were entered by Minnesota high schools in the state contest. Preliminary local contests were conducted in all of these schools, and in a number of counties the County Medical Auxiliary offered awards. It is estimated that approximately ten thousand talks on the subject, "Fight Tuberculosis with Modern Methods," were written in this contest. Awards for the greatest effort in connection with the contest were as follows: First, a drill press for the manual training department, Detroit Lakes High School; second, a jig saw, to the Redwood Falls High School.

When it is realized that in addition to the research work done by the students and the preparation of their papers, talks were presented in every community to local audiences before they were sent to the state contest, and the daily radio broadcasts of the winning talks over a period of ten days reached thousands of people, the widespread educational value of the contest is evident.

The educational plan, which originated in Minnesota and which has been sponsored by the Woman's Auxiliary since its inception five years ago, has now been adopted in many states, among them the neighboring states of Wisconsin and Iowa.

* * *

The second week in November found Mrs. F. J. Elias in Chicago attending a Session of the Board of Directors of the Auxiliary to the American Medical Association. In the autumn every year, this Board has a one-day session, and the accumulated problems are brought before the group by the members. Much help is given to all by the national chairmen, and the exchange of ideas and programs of work are mutually helpful. This year there were thirty-two members present. The session was called to order at ten o'clock, Mrs. Rogers N. Herbert, president, presiding. A great deal of time was given over to the new Treasurer's Receipt Blanks introduced by the treasurer, Mrs. Eben J. Carey of Milwaukee. Along with this topic, a clarification of budgets and finances in general was indulged in. Luncheon was a social event, the Chicago Auxiliary entertaining the group in their gracious way. There were one hundred and fifty women at this luncheon. The afternoon meeting was called to order at 1:30. The reports and suggestions from national chairmen, and state reports filled the time. These were instructive and helpful.

Besides Mrs. Elias, Mrs. E. M. Hammes, president-elect, and Mrs. James Blake, finance chairman for the National Board, attending the meeting.

Mrs. Rogers N. Herbert of Nashville, Tennessee, president of the Auxiliary to the American Medical Association, was the guest of Minnesota Auxiliary women January 26 and 27. She was on her way to Washington and the western states and was entertained at a State Board meeting in Saint Paul January 27, and also at a tea given in her honor by the Ramsey County Auxiliary.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of December 11, 1935

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, December 11, 1935. The meeting was called to order at 8 o'clock by the President, Dr. A. R. Hall. There were forty-seven members present.

Minutes of the November meeting were read and approved.

The president appointed a necrology committee consisting of Drs. Balfour, Braasch and Walters, to write a memorial to Dr. E. S. Judd.

Upon ballot, the following officers were elected for 1936:

President—Dr. Thomas S. Roberts, Minneapolis.

Vice president—Dr. E. M. Jones, Saint Paul.

Secretary-Treasurer—Dr. R. T. LaVake (re-elected).

The scientific program followed.

VISUAL FIELD CONTRACTIONS AFTER HEAD INJURY

HENDRIE W. GRANT, M.D.
Saint Paul

Dr. Grant read his inaugural thesis on the above subject and showed slides of visual fields in several cases.

Summary

Following head injury, contraction of the visual fields may be due to many causes. Some are purely neurologic, others appear psychic, and in still others both factors seem closely related. Contracted visual fields, simulating hysteric types in post-concussion syndromes, return to normal before cessation of other symptoms, and before settlement of the liability. They are explained as due to retinal congestion after vasomotor disturbance or to commotio retinae, causing physiologic block of the light impulse. Visual field studies and hearing tests with the audiometer are valuable adjuncts in the study of head trauma and the post-concussion syndrome.

Discussion

Dr. W. E. CAMP (Minneapolis): I was very much interested to hear Dr. Grant's paper. There was one thing I would like to mention and that is where there is a moderate degree of contraction of the visual fields, may it not be due to spasm of the retinal vessels rather than to the commotio retinae?

Dr. A. E. SMITH (Minneapolis): There is one thing which I think is important in differentiating the psychogenic cases from those due to trauma or organic disease, and that is that the people with hysterical field contractions almost always get around well in traffic, whereas the organic cases, in which the fields are correspondingly limited, do not.

I was interested in what Dr. Grant had to say about petechial hemorrhages through the cortex following an injury which did not have skull fracture. They

practically never occur in cases in which there is skull fracture, but are found in the fatal cases of brain injury in which the cranial case is intact.

DR. GRANT (closing): In the past year there appeared an editorial in the *Journal of the American Medical Association*, which took up the question of visual field contractions following head injuries and the statement was made that moderate contractions of the field are always of pathologic nature. They believed also that marked concentric contractions were probably hysterical. This reference was from a German publication. The work of Klar on the diastolic pressure in the retinal vessels appeared at a later date. There is no unanimity of opinion of the cause of marked contractions of visual fields as to whether they are organic or psychogenic in origin, but the opinion up to the past few years was that they were hysterical. We are now beginning to believe that these visual field contractions do take place after trauma and are of organic origin. They can probably be differentiated by other symptoms, especially if vestibular and auditory are considered with them, as vestibular disturbance occurs in almost 100 per cent of the cases.

HEMORRHAGIC PURPURA

H. Z. GIFFIN, M.D.
Rochester, Minnesota

Abstract

My remarks are based chiefly on experience with sixty-two patients who underwent splenectomy for hemorrhagic purpura between March 7, 1923, and December 1, 1935.

Five of these patients died in the hospital. At first sight, this postoperative mortality seems rather high, but it should be stated that all of these patients who died were operated on during an acute phase of the disease. In three of these five cases the condition was chronic; in the other two it was incipient. In reviewing the histories, it is likely that two of the three patients in the acute phase of chronic hemorrhagic purpura would not now be submitted to splenectomy. These two patients were in extremis when admitted and they did not improve on medical treatment. They had cerebral symptoms and were operated on in an emergency in the hope of preventing massive cerebral hemorrhage.

In addition to these five patients who died in the hospital, four others have died subsequently. One of these four died of lobar pneumonia two years following operation. The other three had conditions related to the disease, one of them dying of cerebral hemorrhage less than one year following splenectomy, one of hepatic insufficiency with jaundice seven years following splenectomy, and the third apparently of uncontrollable uterine hemorrhage at puberty five years after splenectomy. It is likely that this last patient could have been saved had it been possible to send her to a medical center.

The remaining fifty-three patients are alive and are either in fairly good or excellent condition up to twelve years following splenectomy.

Classification of Cases.—The cases are grouped as follows:

Incipient of moderate severity.....	2
Incipient in acute phase.....	9
Chronic recurrent of moderate severity.....	39
Chronic recurrent in acute phase.....	12

This clinical grouping has been adopted in order to study more carefully the features of acute exacerbation, during which the operative mortality is high. Incipient cases are those in which patients are suffering from their first attack of hemorrhagic manifestations.

In general, a study of the cases from this standpoint indicates that patients with incipient cases of moderate severity can be operated on with very little risk, if the condition shows no tendency to spontaneous remission. Incipient cases in an acute phase have a high operative mortality, but if the patients survive operation, a satisfactory result is obtained. The most difficult group in which to make a decision with respect to splenectomy is that of chronic cases in a severe acute exacerbation. Patients with this type of the disease may be in extremis when seen, and, unless there is some response to transfusions, surgical treatment is likely to be of little avail; particularly is this true when cerebral symptoms are present, and I feel that patients of this type with cerebral symptoms should not be submitted to splenectomy.

Pre-operative and Postoperative Duration.—The pre-operative duration of the disease varied from several weeks to fifteen years; in most cases it was two years or less. The postoperative period of observation has been up to twelve years in two cases, and from eight to twelve years in nineteen other cases.

Age and Sex of Patients.—One patient was in the seventh decade of life. Nine were less than ten years of age. The largest number were between the ages of twenty and forty years. Forty-one patients were females, twenty-one males; in other words, 66.1 per cent were females.

Types of Bleeding.—As would be expected, the most common types of bleeding were from the nose and gums and into the skin. However, about half of the female patients had excessive uterine bleeding, and in a third of the cases there was gastrointestinal bleeding. In one out of ten cases bleeding was from the urinary tract.

Size of the Spleen.—A study of the size of the spleen, corrected for age and sex of the patient, revealed that nine of the spleens were normal, fourteen less than normal size. Only one spleen was exceedingly large. It is clearly not necessary to be able to demonstrate an enlarged spleen clinically in order to anticipate a satisfactory result from splenectomy. The smallest spleen weighed 30 grams, the patient being a girl six years of age; the largest spleen weighed 700 grams, the patient being ten years of age. The largest adult spleen weighed 550 grams.

Platelet Counts.—Preoperative platelet counts, made by the direct method using sodium citrate, averaged 75,000 per cubic millimeter. Platelet counts following splenectomy, up to twelve years afterward, averaged 193,000 per cubic millimeter. It is frequently stated that,

after the initial increase in platelets following splenectomy, the platelet count becomes reduced to its former level. In my experience this has occurred in only a small proportion of the cases. Usually the platelet level is considerably higher on multiple counts following splenectomy than preceding it.

Recurrences.—Recurrent bleeding has occurred in 35.4 per cent of the cases, and, for the most part, has been of mild degree. The highest percentage of recurrences has been among patients with chronic cases who were operated on in the acute phase of the disease. It has not infrequently been noted that mild recurrences have ceased and more severe recurrences have become less severe following the elimination of focal infection.

Conclusions.—Patients with a chronic form of hemorrhagic purpura of mild severity are best treated by elimination of focal infection, an adequate diet, the administration of iron, and, if necessary, transfusions.

Chronic hemorrhagic purpura of the disabling type is best treated by splenectomy during remission.

Patients with chronic hemorrhagic purpura seen during acute exacerbations should be treated medically and given an opportunity to improve, at least temporarily, before splenectomy is performed. If their response is unsatisfactory, splenectomy may be necessary even though the operative risk is increased.

Incipient hemorrhagic purpura of short duration and of mild or moderate severity should be treated medically.

Patients with the incipient form of the disease which progresses in spite of medical treatment should be submitted to splenectomy without much procrastination.

Discussion

DR. C. B. DRAKE, Saint Paul: I am prompted to mention very briefly a case of the opposite condition which I recently encountered; that is, one with a very high blood platelet count. The patient was admitted to Ancker Hospital early this year with a count of over 2 million platelets on repeated examination, and one time as high as 2,500,000. She came in because of extensive subcutaneous hemorrhages. Her red count was 4,500,000 and leukocytes 35,000. At first she had little to complain of except these large areas of subcutaneous hemorrhages. There were at first no abnormal white cells except a very occasional degenerated megakaryocyte. However, after several months she showed numerous immature white cells which placed her very definitely in the leukemia group. A very high blood platelet count, therefore, as well as a low platelet count may have hemorrhage as an outstanding symptom.

DR. M. H. HOFFMAN, Saint Paul: The particular type of thrombocytopenic purpuras which present the greatest problem to the physician are those who never had hemorrhages before and develop an acute attack. One wonders whether or not to advise splenectomy even though the medical treatment brings about a cessation of the bleeding. I recall one patient who apparently recovered pretty well from the acute attack, then later had reduction of the thrombocytes with a brain hemorrhage and promptly died. The other patient was a thrombocytopenic purpura case for at least a week before I saw him. He was not put to bed and one day, on his way home from a last visit to the doctor's office, he had a severe headache. They could not get his own doctor and called me. He died of brain hemorrhage. The question is, just when should these patients be operated on? Should a splenectomy be done after the first attack, even though the thrombocytes are re-

BOOK REVIEWS

stored, to prevent accidents such as those just mentioned? I would also like to ask Dr. Giffin if he has had any experience with large doses of liver extract, fifteen to twenty times the amount given for pernicious anemia, and whether it has any effect on improving the number of thrombocytes.

DR. S. MARX WHITE, Minneapolis: One thing might be stressed in this connection, and that is the care with which the diagnosis of thrombocytopenic purpura should be made. I know that among practitioners of medicine as in this group there would be little likelihood for lack of care in developing diagnostic criteria for the diagnosis of the condition. At the same time we know that those studies are not always made. My reason for stressing care in diagnosis is that we are having in this part of the country now more cases of spotted fever of the infective type of the disease; not necessarily the fatal type as in the Bitter Root Valley, but the non-fatal types in which the fundamental condition is not a true thrombocytopenic purpura but an infectious disease with purpura. I think one should sound the warning that a case of purpura, simply because of purpuric manifestations, should not be put in this group and should not be operated on until a fundamental diagnosis is made.

DR. W. E. CAMP, Minneapolis: I would like to ask Dr. Giffin if any evaluation can be placed on the removal of foci of infection in the recovery of these cases?

DR. GIFFIN: The case Dr. Drake describes brings up a question with respect to the past history. Is it possible that this patient formerly had had polycythemia vera?

DR. DRAKE: My patient had been bled in November,

1934, at the out-patient department of the Ancker Hospital, presumably because of a suspected polycythemia, the reds at that time numbering 5,800,000 and the platelets over 1,000,000. She presented at that time an overproduction of red and white cells as well as platelets. The question arose, when I first saw the patient, of whether a diagnosis of thrombocytopenia as an entity was justified. Later the blood picture became that of a myelogenous leukemia.

DR. GIFFIN: Cases of polycythemia vera almost always have high platelet counts and, for some reason or other, the high platelet count persists even though the patient later becomes somewhat anemic. Dr. Drake's statement that a study of blood smears reveals evidence of immaturity is also consistent with the diagnosis of polycythemia vera in its advanced stages.

The question of whether or not to recommend splenectomy in the acute phases of either a chronic recurring case or an incipient case, is very difficult to decide; in fact, it is almost an impossible decision to make. My experience has led me to endeavor first to carry the patient through the acute phase, hoping that a remission will occur, but, if a favorable response is not prompt, the patient is submitted to splenectomy.

In reply to Dr. Hoffman's question, the administration of very large doses of liver extract intramuscularly has been tried without specific effect.

The question of the importance of focal infection can be argued pro and con. Experience seems to indicate, however, that in a high percentage of cases post-operative recurrences have ceased after the elimination of focal infection.

The meeting adjourned.

R. T. LAVAKE, M.D., Secretary

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

PROCEEDINGS OF THE TWENTY-NINTH ANNUAL CONVENTION OF THE ASSOCIATION OF LIFE INSURANCE PRESIDENTS. 220 pages. 1935.

FOR AND AGAINST DOCTORS. By Robert Hutchison and G. M. Wauchope. 168 pages. Illus. Price, \$2.00, cloth. Baltimore: William Wood & Co., 1935.

GLANDULAR PHYSIOLOGY AND THERAPY. A symposium prepared under the auspices of the Council on Pharmacy and Chemistry of the American Medical Association. 528 pages. Illus. Price, flexible binding, \$2.50. Chicago: American Medical Association, 1935.

OBJECTIVE AND EXPERIMENTAL PSYCHIATRY. D. Ewen Cameron, 264 pages. Price, \$3.00. New York: The MacMillan Company, 1935.

Following the close of the World War, some psychiatrists, according to the author, found themselves in a sad dilemma. They sought more solid ground while facing the harder realities of active treatment. And "an increasing number of us experience a feeling of growing distrust of purely descriptive and intuitive concepts of human behavior and find it more and more difficult to content ourselves with facts or assertions save where they will withstand experimentation and will not fail us on prediction." A great de-

velopment of instrumentation and a larger understanding of experimental methods should in a fair way make possible an objective analysis of human behavior, and also enable us to predict and control such behavior.

In the first two chapters the author seeks to clarify the development and present position of experimentation and quantitation in psychiatry. Present methods of fact gathering have given rise to some assumptions which are criticised. Dogmatic statements of gifted leaders and knowledge gained from all too confusing observational methods are regarded as still playing too prominent a part.

In the following fourteen chapters as many topics, ranging from tests of intelligence to constitution, are discussed from the point of view of experimentation and quantitation indicated in many of the investigations that were reported in the literature mainly during the last decade and a half.

There then follows a chapter on pathology. Due to the tendency to favor study and attempted control of the organism in action rather than brain anatomy and pathology, pathology has declined somewhat and biochemistry and physiology have come more to the fore.

The final chapter of five pages is devoted to a discussion of the instruments of statistical methods.

It is a pleasant task to review this book. The subject matter represents wheat which is readily separated from the all too bulky chaff of pseudo-scientific literature produced unfortunately without adequate restraint.

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MINNESOTA MEDICINE